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Tapp, Eric A.

Monterey, California. Naval Postgraduate School

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THESIS

DEVELOPMENT OF A CASCADE SIMULATION
OF FAN-PASSAGE FLOW

by

Eric A. Tapp

December, 1993

Thesis Advisor: Raymond P. Shreeve

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13. ABSTRACT *(maximum 200 words)*
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Development of a Cascade Simulation
of Fan-Passage Flow

by

Eric A. Tapp
Lieutenant, United States Navy
B.S., Jacksonville University

Submitted in partial fulfillment
of the requirements for the degree of

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Author: _____
Eric A. Tapp

Approved by: _____
Raymond P. Shreeve, Thesis Advisor

_____
Garth V. Hobson, Second Reader

_____
Daniel J. Collins, Chairman
Department of Aeronautical and Astronautical Engineering

ABSTRACT

A small-scale blowdown wind tunnel apparatus was developed to investigate techniques to alleviate the negative effects of shock-boundary layer interaction in the blading of aircraft engine fans. Using shadowgraph and surface injection techniques, probe surveys and static pressure measurements, it was shown that acceptable periodicity and repeatability could be obtained in a two-passage cascade model at M=1.4 if air supply pressure, back pressure and porous-wall bleed pressures were properly controlled. It was also shown that local separation due to shock boundary layer interaction was present at the design flow incidence of 1.15 degrees, but not at 0.85 degrees. Complete data are reported for the design condition to serve as a baseline for separation alleviation experiments. Necessary hardware and software developments are also documented.

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iii

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

A. BACKGROUND

Manufacturers are designing for higher thrust in turbofan engines for transonic and supersonic aircraft. The advanced fan designs experience shock-boundary layer flow interactions in the fan passages, causing losses which are greater than are calculated for the shock and the boundary layer separately. The interaction is shown schematically in Figure 1. Characteristic features include a local region of flow separation and reattachment causing a local oblique shock
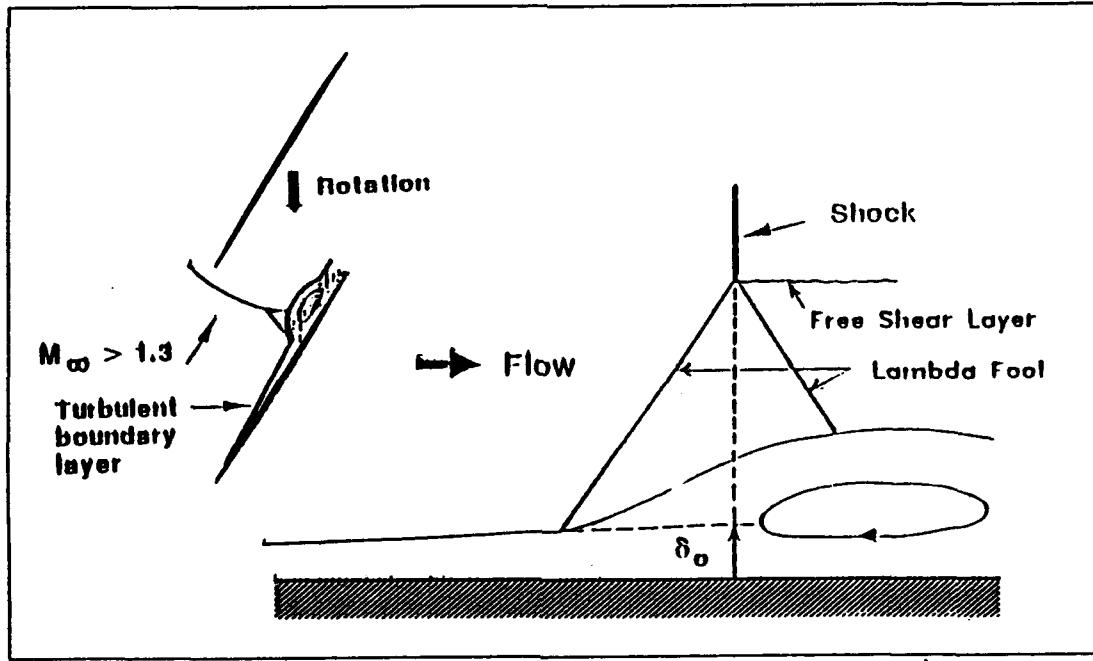
Figure 1.   Shock-Boundary Layer Interaction

structure which is referred to as a "lambda-foot." For relative Mach numbers greater than the threshold value of 1.3, local separation of the turbulent boundary layer can occur and desired turning angles may not be achieved. Furthermore, the process might not be steady.

In order to examine techniques for alleviating separation, a non-rotating simulation of the relative flow was required. Additionally, the simulation had to contain the interaction on a scale large enough to adequately measure. Thus, the development of such a model simulation has been the goal of the present work, which follows the previous studies of Collins [Ref. 1], Golden [Ref. 2], and Myre [Ref. 3].

B. TRANSONIC CASCADE MODEL

The wind tunnel used in the present work was originally designed by Demo [Ref. 4]. Figure 2 is a schematic of the facility as reconfigured by Collins [Ref. 1] and Golden [Ref. 2] and used in the present study. A full description of the facility is given by Myre [Ref. 3]. The test section shown in Figure 3 was designed to simulate the flow in two passages of a transonic fan operating at a relative Mach number of 1.4. The fan geometry and design flow conditions are shown in Figure 4. Important in the simulation was the removal (by natural aspiration) of the boundary layers from all four walls of the nozzle. Details of the geometry through which this was achieved are given in Figure 5 and Figure 6. Visible in

2

Figure 5 is a porous-wall section at the end of the upper nozzle block. Air entering or leaving through the porous wall could be throttled (to or from atmosphere) using the "Porous Bleed Valve (PBV)", which is also visible in the figure. Pressure ratio across the blading could be increased using the "Back Pressure Valve (BPV)" shown in Figure 2. The flow incidence could be changed by rotating the complete model (upper blade, center blade, lower blade, and inner side walls, held between heavy, round aluminum side plates).
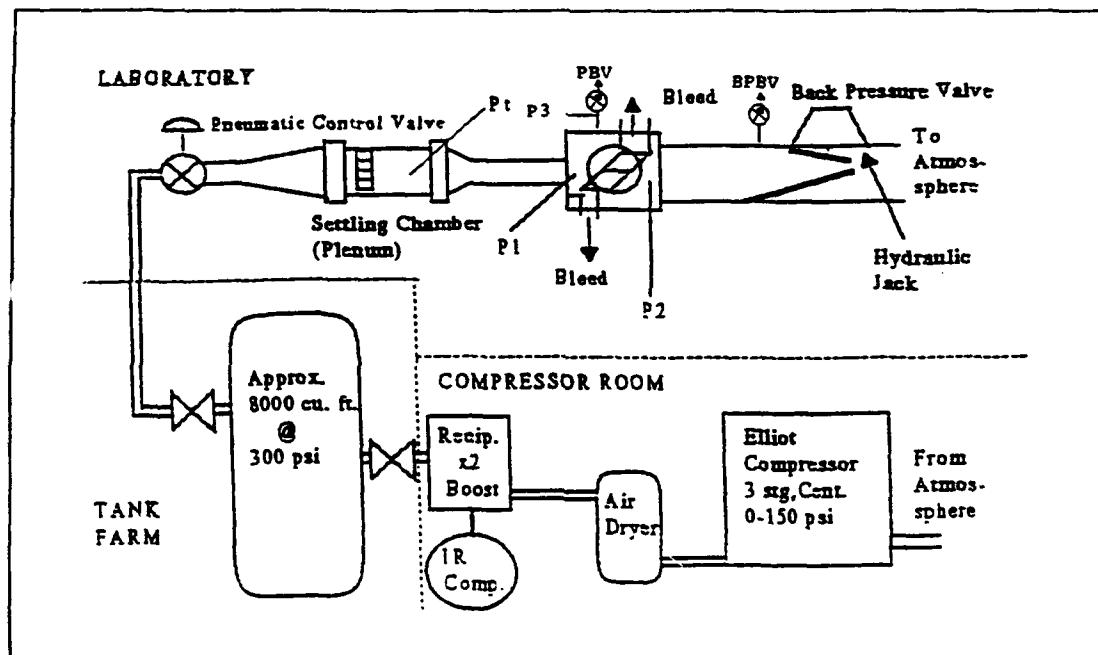
Figure 2. Wind Tunnel Facility Schematic
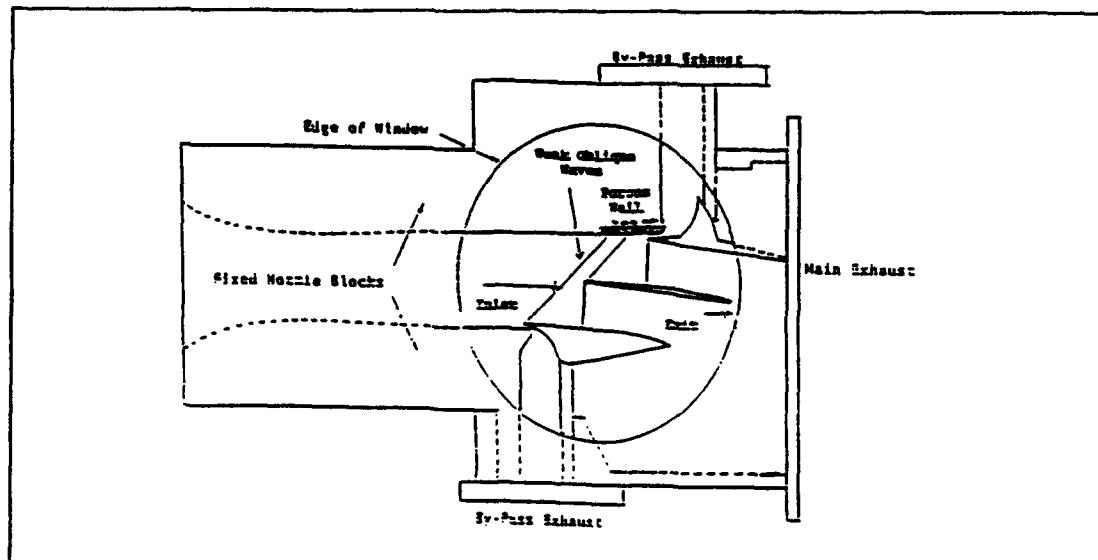
Figure 3. Test Section Schematic

L.E. RADIUS   = .015 IN.
T.E.RADIUS   = .015 IN.
WEDGE ANGLE   = 3.5 DEG.
WEDGE LENGTH   = 2.85 IN.
ARC RADIUS   = 13.53 IN.
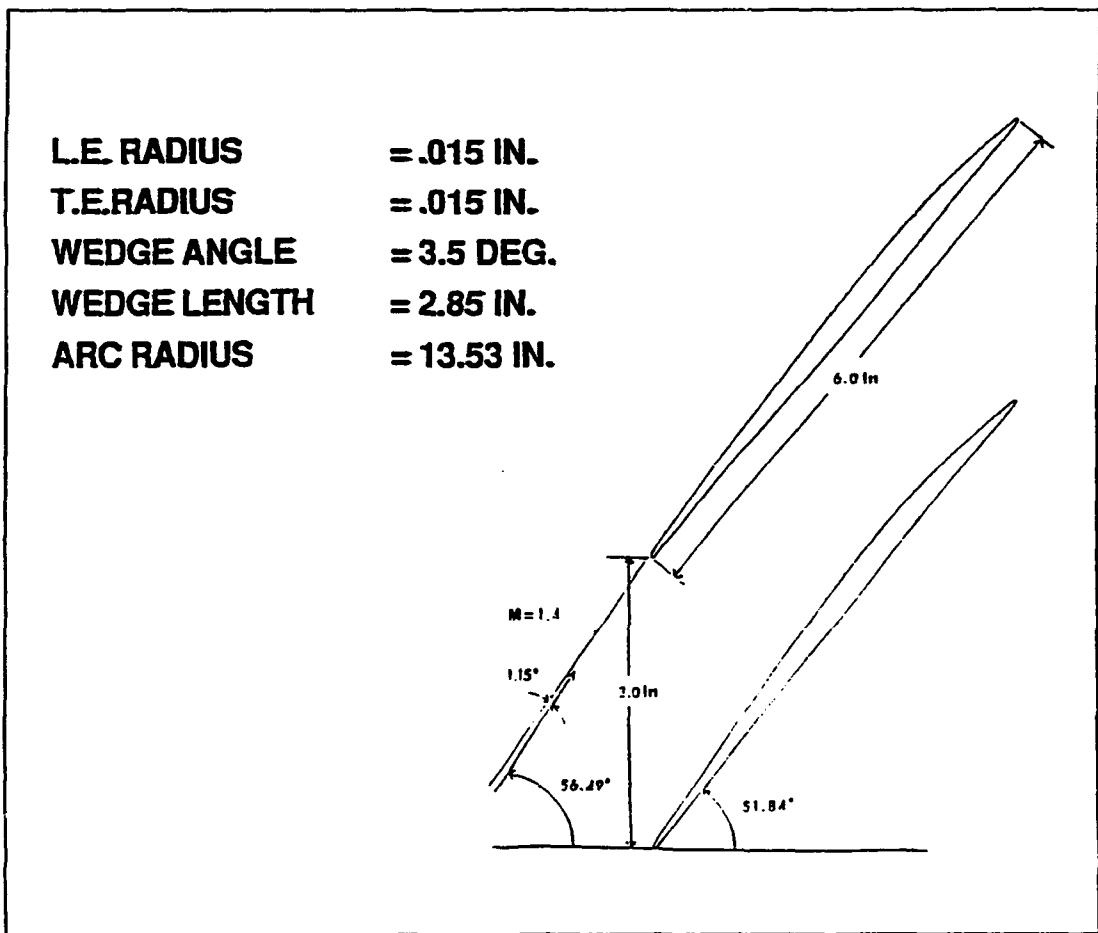
Figure 4. Transonic Cascade Blade Geometry

4

Figure 5. Test Section

SECTION NORMAL TO SCOOP LEADING EDGE

INNER SIDE WALL

PLEXIGLAS
WINDOW

ALUMINUM
SIDE PLATE

FLOW

SECTION ALONG THE STREAMLINE

0   1
INCH
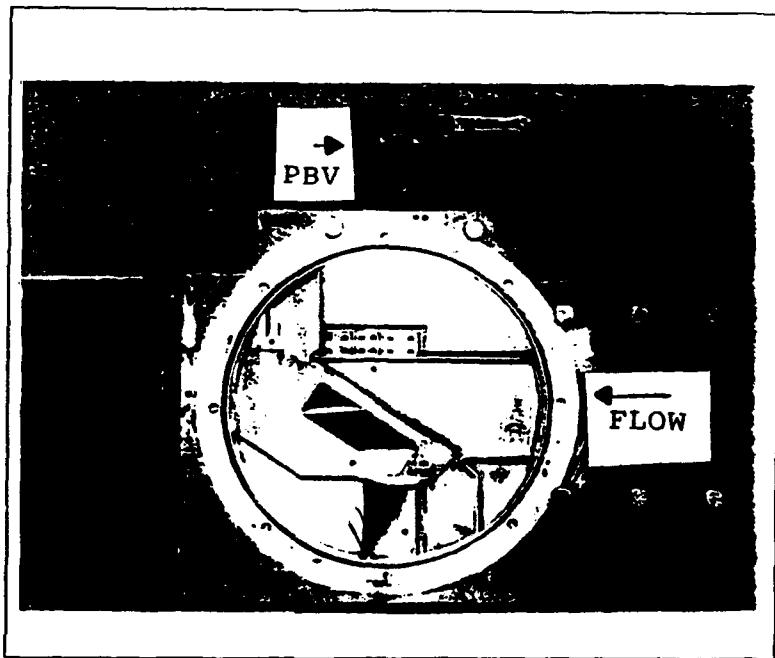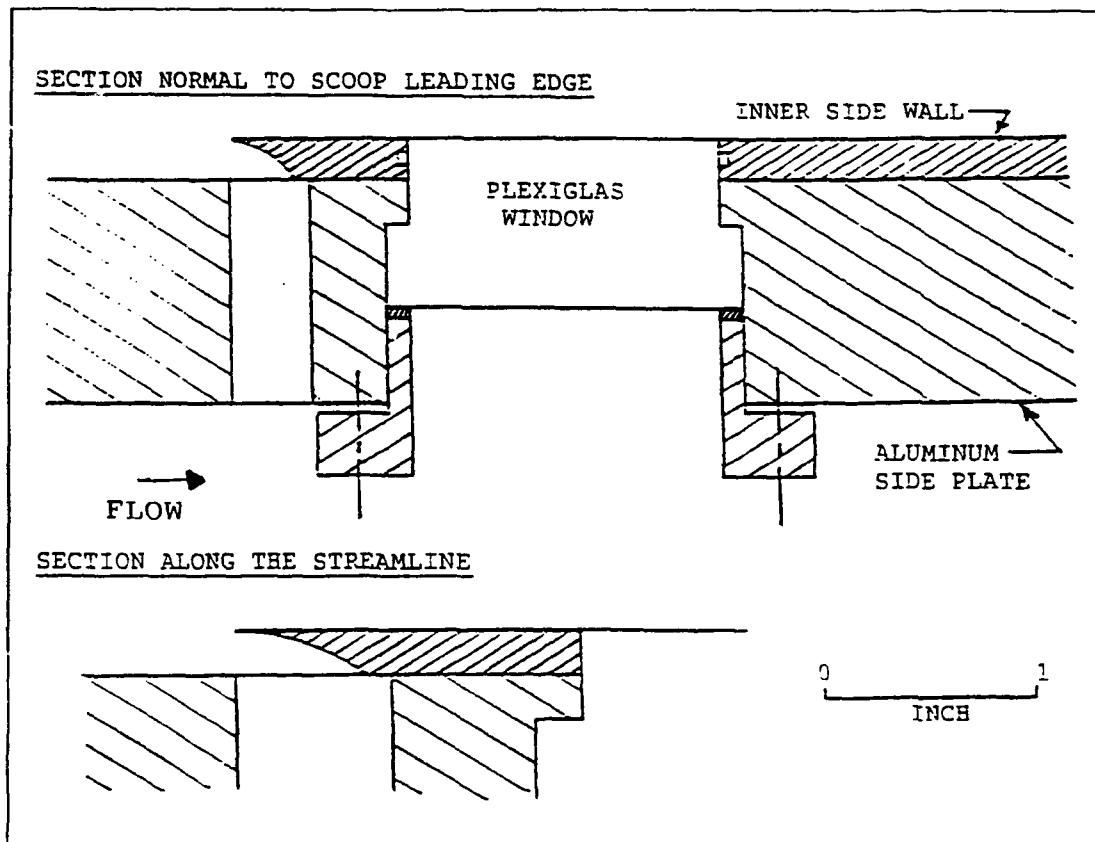
Figure 6. Boundary Layer Diversion

5

C. STATUS AND OBJECTIVES

Following initial tests by Collins [Ref. 1], Golden [Ref. 2] modified the BPV and obtained static pressures throughout the test-section at the nominal design incidence angle (1.15 degrees to the suction surface). While the flow in the lower passage was shown to be surprisingly two dimensional, the shock waves could not be placed in similar positions in the upper and lower passages at the same pressure ratio. Myre [Ref. 3] designed and implemented an impact survey probe and experimented with changes in flow incidence. Myre also found that the flow was not periodic at design incidence, but obtained similar shock positions in upper and lower passages at -0.85 degrees incidence. However, the static pressure distribution on the lower blade suggested that there might not be a flow separation at this condition.

The goal of the present work was to achieve, as closely as possible, repeatable and periodic conditions in upper and lower passages at design incidence (1.15 degrees) and close to design pressure ratio (2.176). After initially considering the use of "tailboards", it was found that the shock position in the upper passage could be controlled using the PBV if the tunnel supply pressure was kept within a limited range. Repeatability was achieved when shadowgraph/flow visualization was used to position the shock waves. No practical method was found to repeat periodic conditions when instrumented aluminum

blanks were used to measure sidewall static pressures. It was concluded that static-pressure taps in Plexiglas windows were required if periodicity in static pressure was to be shown successfully.

In the present document, the changes made to the apparatus and data acquisition procedures are reported in Chapter II. The experimental program and results are documented in Chapter III; conclusions and recommendations follow. Considerable effort was required to expand the capability of the data acquisition process. Specifically, up to 96 pressure channels were recorded, within a two-minute test period, using on-line calibration in two different ranges of differential pressure. These details are given in Appendices A and B. Selected data are given in Appendix D.

II. MODIFICATIONS TO THE APPARATUS, INSTRUMENTATION, AND DATA ACQUISITION SYSTEM

A. APPARATUS

The need to repeat the setting of the pressure ratio with greater precision led to the installation of the "Back Pressure Bleed Valve (BPBV)", shown in Figure 2. The BPBV augmented the coarse BPV settings, giving the operator a fine adjustment of the pressure ratio to within +/- 0.01. The BPBV, a 1/4 inch stem-type valve, allowed the throttling of the air flow downstream of the fan passages to be increased or decreased. This overcame the limitation of the system using the BPV alone, which was that the manual hydraulic jack actuation could be applied only in the direction of increasing throttling (and therefore pressure ratio).

B. INSTRUMENTATION

When a direct correspondence between the PBV position and the upper passage shock location was found, the need arose to determine and monitor the pressure in the pipe ahead of the PBV. Figure 7 shows the +/- 10 psid transducer that was added to do this. The connection to the transducer is shown as P3 in Figure 2 and Figure 7. The signal conditioning and scanning were the same as for pressures P1 and P2 [Ref. 3]. The transducer low side was open to the atmosphere so that the
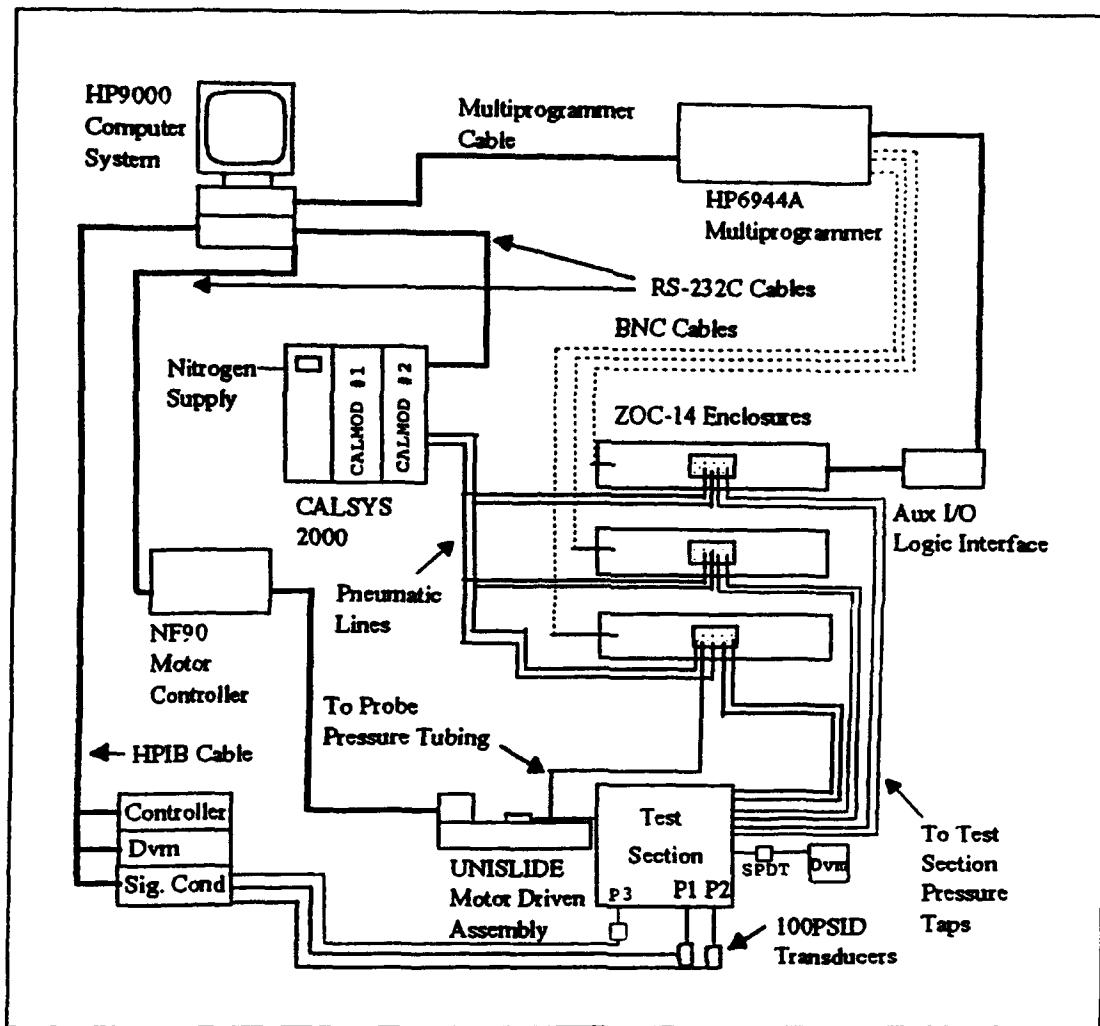
Figure 7. Data Acquisition Schematic

pressure(P3) was monitored as a gauge pressure and then displayed in units of psia. Displaying P3 and P3/P1 required modification of the data acquisition program NEW_SCAN_ZOC as described in Appendix B.

A second +/- 10 psid transducer, referred to as the "Shock Placement Differential Transducer (SPDT)", also shown in Figure 7, was installed to detect the difference in the pressure at the same selected chordwise location in the upper

9

and lower passages. Two pressure taps from the right-hand (looking downstream) sidewall window blank, one from the lower and one from the upper passage (refer to Appendix A for exact locations), fed the high and low side of the transducer respectively. The locations of the selected pressure taps were at 43 percent chord, where the sidewall pressure was expected to lie roughly mid-way between P1 and P2 when the passage shock was in its design position. By monitoring the conditioned output of the transducer on a Digital Volt Meter (DVM), the operator could attain similar positions of the passage shocks by adjusting the BPBV and PBV until the pressure differential was approximately zero.

C. DATA ACQUISITION

1. ZOC-14 Module Additions

Myre [Ref. 3] had completed his work using one ZOC-14 electronic pressure scanning module (ZOC #1, +/- 50 psi) to record tunnel stagnation pressure, lower blade static pressures and impact probe pressure measurements. In the current work, as shown in Figure 7, two additional ZOC-14 enclosures (ZOC #2 AND #3), each in the range of +/- 15 psi, were added to acquire left- and right-sidewall pressures. No additional computer programming was required for the acquisition, however, since Wendland had allotted code for future expansion [Ref. 5].

10

The details of the ZOC enclosures, system connections, and calibration are given by Wendland [Ref. 5]. Complete sidewall pressure tap connection diagrams are given in Appendix A.

2. Calibration Module

Since the two ZOC enclosures that were added involved transducers having a lower pressure range than ZOC #1, a second on-line calibration module was also required. The second CALSYS 2000 Calibration Module (CALMOD #2), in the 0-100 psi range, was obtained and installed prior to the current work. Again, Wendland, in his software, had provided for a multiple CALMOD data acquisition system. However, initial attempts to address CALMOD #2 were unsuccessful. Eventually, after corrections by the manufacturer (see Appendix 3), the second CALMOD was incorporated successfully.

Figure 7 shows the complete system with the additional CALMOD included. In this configuration, CALMOD #1 was set to apply calibration pressures of approximately 30, 60, and 90 percent of the ranges of ZOC #2 and ZOC #3 (or 9.2, 18.3, and 27.5 inches of mercury). Similarly, CALMOD #2 was used to calibrate ZOC #1 and was set to apply approximately 30.5, 61.1, and 91.6 inches of mercury.

III. EXPERIMENTAL PROGRAM AND RESULTS

A. Experimental Development

The goal of the initial tests was to verify Myre's results at an incidence angle of -.85 degrees [Ref. 3]. At first, contrary to expectations, both passage shocks did not move upstream together as the BPV was operated. Through several tests, it was determined that the tunnel stagnation-pressure level significantly affected the behavior of the two shocks. Additionally, in a certain range of pressure, PBV adjustment greatly influenced the upper passage shock position.

A shadowgraph/video set-up, as shown in Figure 8, aided the operator in placing the shocks. Using this visualization system, over the course of several experiments, a tunnel plenum pressure of 33 psig and a specific fixed setting of the PBV position, was found to give repeatable positioning of the upper passage shock. With these settings, adjustment of the BPV gave simultaneous movement and positioning of both shocks.

Having developed a procedure to place both shocks, flow visualization was used to determine whether boundary layer separation was present. The procedure was to use the shadowgraph system, as shown in Figure 8, to place the shocks, then video tape colored fluid (dye and alcohol mixture) injected through a pressure tap in the lower blade at the

12
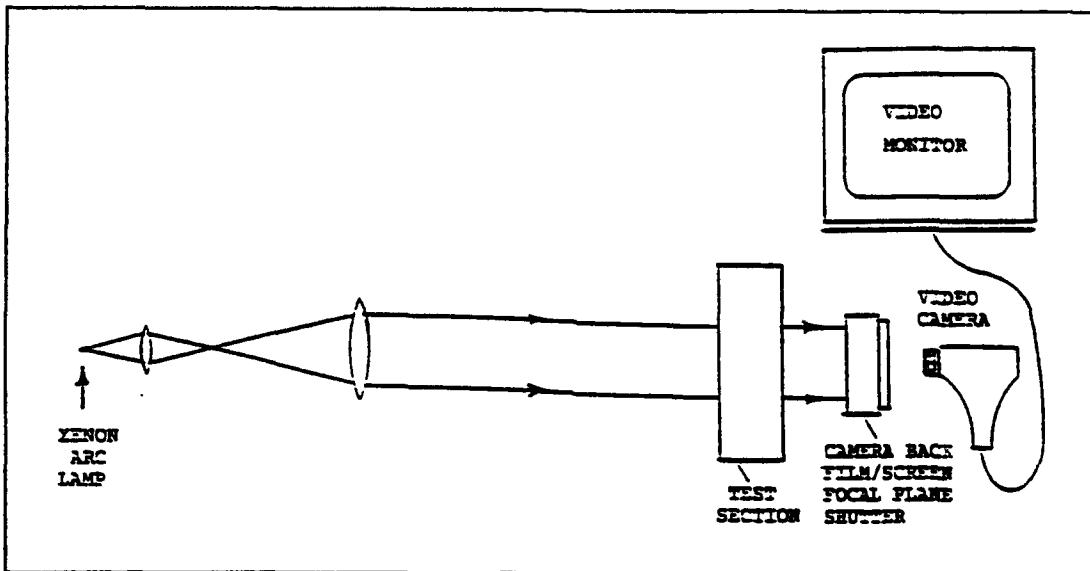
Figure 8. Shadowgraph/Video System

lower passage shock position. The result showed that at -.85 degrees incidence, the shock in the lower passage did not cause a local separation of the boundary layer in that no reverse flow could be detected.

The model was then set to 1.15 degrees (design) incidence and, as shown in Figure 9, the shocks again were successfully placed at corresponding positions in the two passages, using the shadowgraph. In order to achieve the condition shown in Figure 9, the tunnel was operated at precisely 33 psig and the PBV and BPV were adjusted while watching the shadowgraph picture on the video monitor. The fluid injection experiment was then repeated. Eratic cross and reverse flow of the fluid was observed when fluid was injected under the lambda foot.

13

Thus separation was present. A still print of the fluid injection pattern at one point in the video is shown in Figure 10.
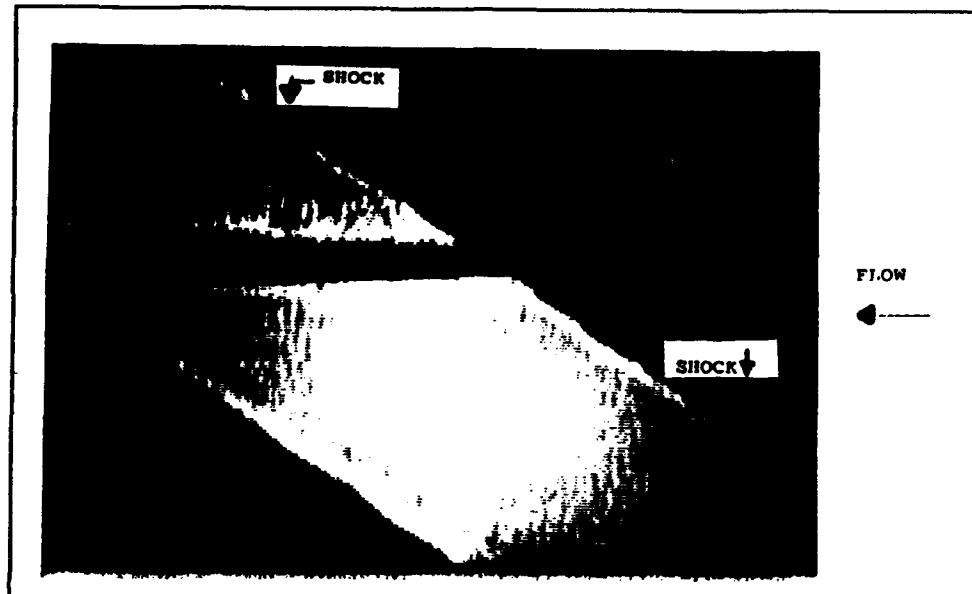
Figure 9. Shadowgraph at 1.15 Degrees
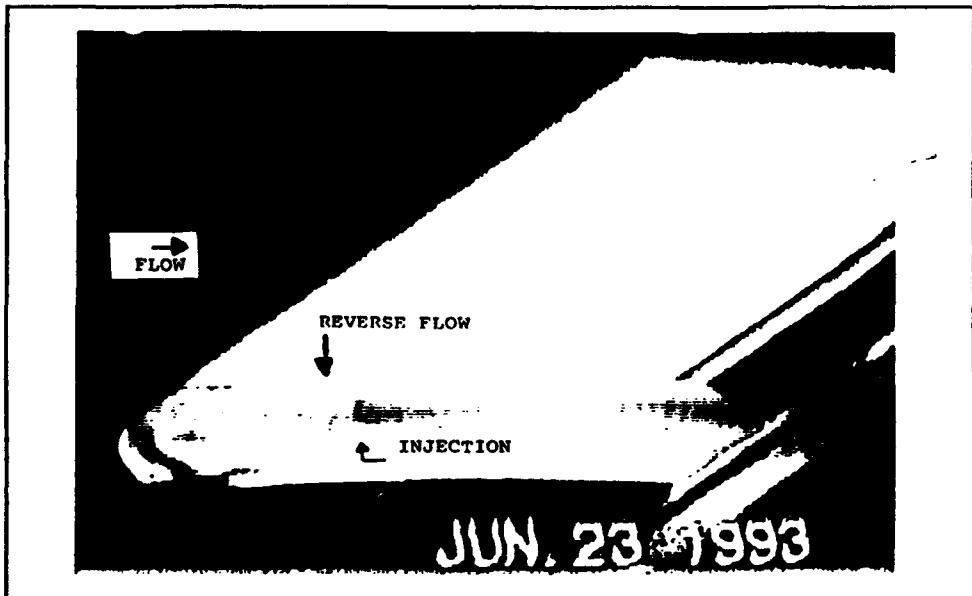
Figure 10. Flow Visualization at 1.15 Degrees

B. Repeatability Tests

The next goal was to show repeatability, in successive tests of the shock placement, the lower blade pressure distribution and the impact probe wake survey. In each test, after the shocks were placed in the two passages (following the procedure described above in Section A), an impact probe survey of the center blade wake was obtained and the lower blade static pressures were recorded using the procedure described by Myre [Ref. 3]. Table 1 lists the test conditions, with the mass-averaged pressure loss coefficient, obtained from impact probe surveys conducted in four consecutive tunnel runs on the same day (25 June 1993).

Table 1. TEST CONDITIONS AND MASS-AVERAGED LOSS COEFFICIENT

Run #	Plenum Pressure (psia)	Pressure Ratio (P2/P1)	Loss Coefficient [Ref. 3]
5	46.690	2.090	0.0919
6	47.023	2.094	0.0889
7	47.259	2.105	0.0848
8	47.321	2.099	0.0946

Shown on the four sections of Figure 11, (a), (b), (c), and (d), are the lower blade center-line static pressure distributions obtained in runs 5, 6, 7, and 8, respectively. These figures demonstrate repeatable shock placement at about 0.4 chord, with near-identical pressure-rise behavior. The only departure from almost identical behavior was in the pressure distribution just before the shock in Run 8. This was an anomaly that was not repeated.

The results of the impact probe surveys are given in Figure 12. In each section of the figure, the center trace is the impact probe measurement; the left and right vertical lines are the exit static and plenum total pressure variations, respectively. These figures show the results of the shock-boundary layer interaction after some mixing has occurred in the wake of the center blade. Visible at the upper edge of the wake is the apparent result of the "lambda foot", which results in less loss in the stagnation pressure than occurs through the normal shock. A complete listing of lower blade and impact probe survey pressures is given in Appendix D.
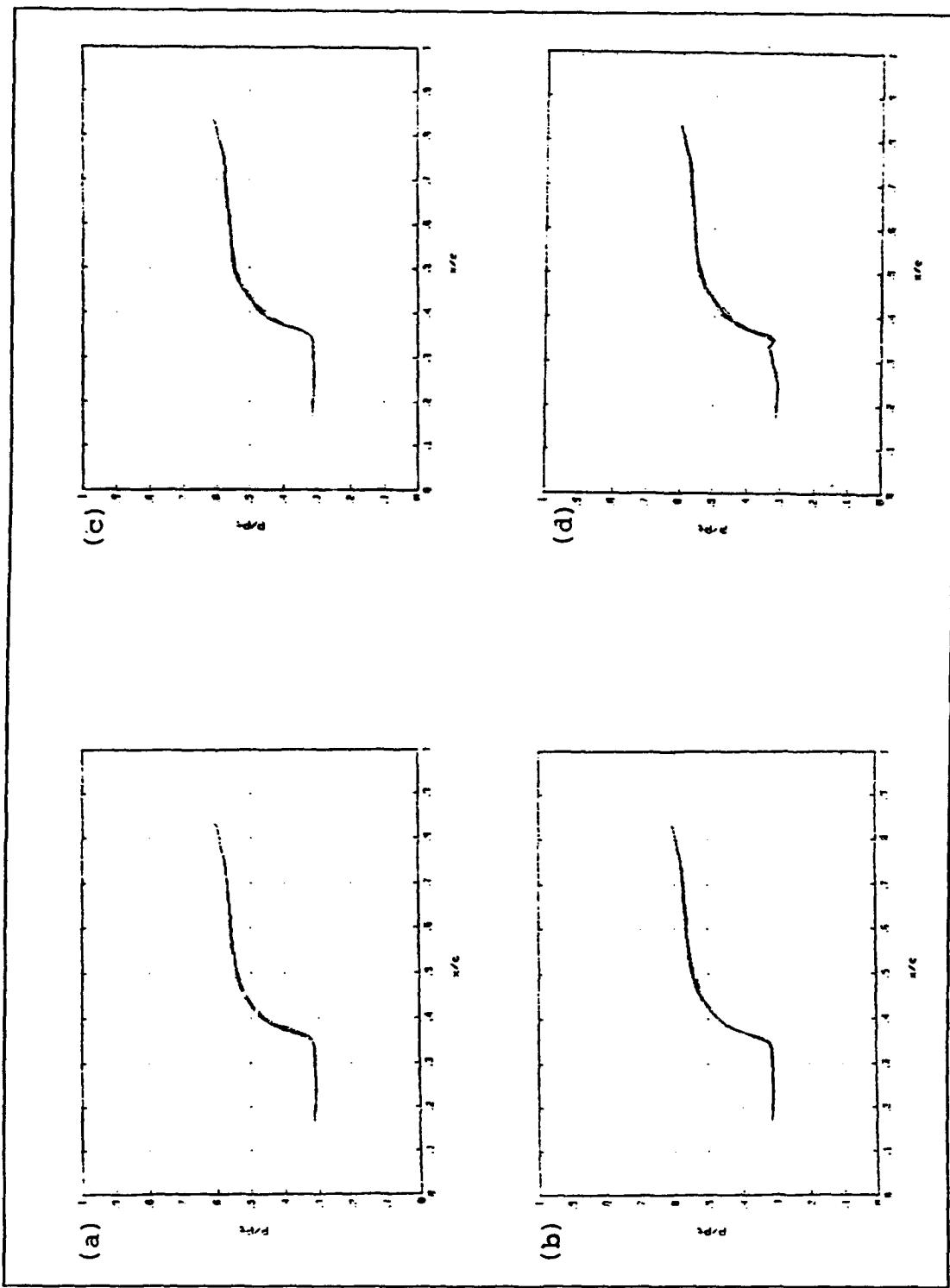
Figure 11. Lower Blade Pressure Distributions; (a) Run 5, (b) Run 6, (c) Run 7, (d) Run 8 on 6-25-93

17
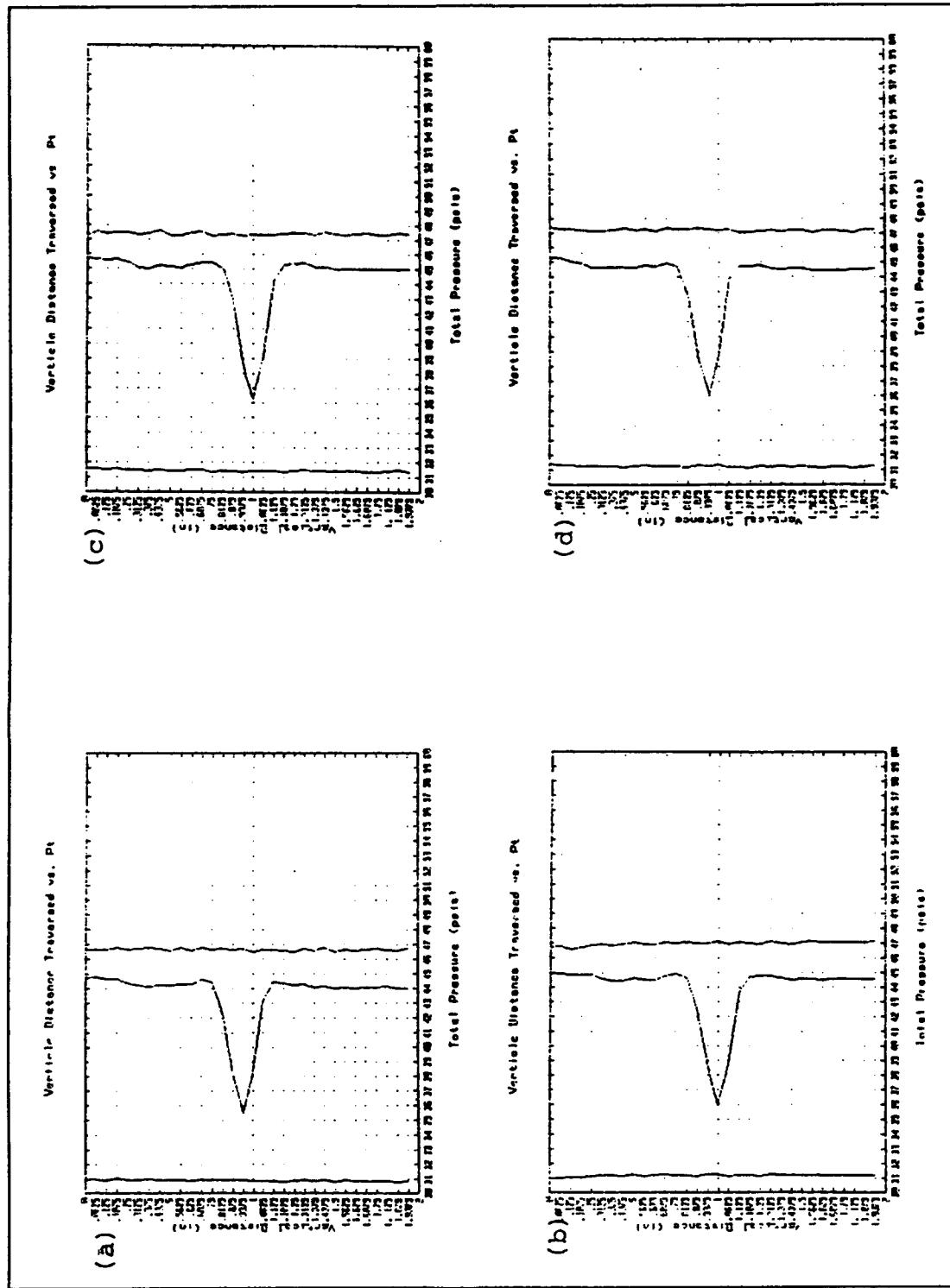
Figure 12. Impact Probe Surveys; (a) Run 5, (b) Run 6, (c) Run 7, (d) Run 8 on 6-25-93

18

C. Tests Without Windows

Having demonstrated that repeatability was attainable based on visual shock settings, lower blade pressure distributions, and wake surveys, the final goal was to simultaneously obtain upper- and lower-passage sidewall pressures. This would show definitively that the passage conditions were fully periodic. First, the aluminum left- and right-window blanks, used by Golden [Ref. 2], were installed in place of the Plexiglas windows. Pressure tap connections from the test section to the ZOC enclosures were made as given in Appendix A. Tests were then conducted from which a number have been selected for discussion, as shown in Table 2. In the process of these experiments, a wide range of pressure ratios (P2/P1) and procedures using the PBV and SPDT were tried in order to obtain the desired shock placement and resulting sidewall pressure distribution.

In the first series of tests, only the left-hand side pressure blanks were installed, the PBV was left in the position found optimum when the shadowgraph technique was last used, and the pressure ratio was set using only the BPV.

Figures 13, (a) and (b), show the results of two separate tunnel runs in which the pressure ratios were negligibly different. The plots show outstanding repeatability and the periodicity was quite good. The upper passage normalized pressure (sidewall static pressure divided by plenum

pressure) dramatically increases in response to the normal shock and the downstream upper and lower passage values show similar behavior.

Table 2. TEST CONDITIONS (TESTS WITHOUT WINDOWS)

Figure, Date, Run	Plenum Pressure (psia)	Pressure Ratio (P2/P1)	Pressure Ratio (P3/P1)	SPDT (psid)
13, 11-2-93, 3	47.027	2.114	not installed	not installed
13, 11-2-93, 5	48.426	2.118	not installed	not installed
14, 11-24-93, 1	48.342	2.107	1.223	-.883
14, 11-24-93, 7	48.446	2.127	1.224	-.820
15, 12-01-93, 1	48.468	2.067	1.154	+/-.210
15, 12-01-93, 6	48.476	2.068	1.156	+/-.210
16, 12-01-93, 8	48.724	2.066	1.155	+/-.351
17, 12-06-93, 3	48.146	2.013	1.232	-.614

Unfortunately, no pressure taps were available in the neighborhood of the shock in the lower passage so that the lower passage shock position could not be verified. In
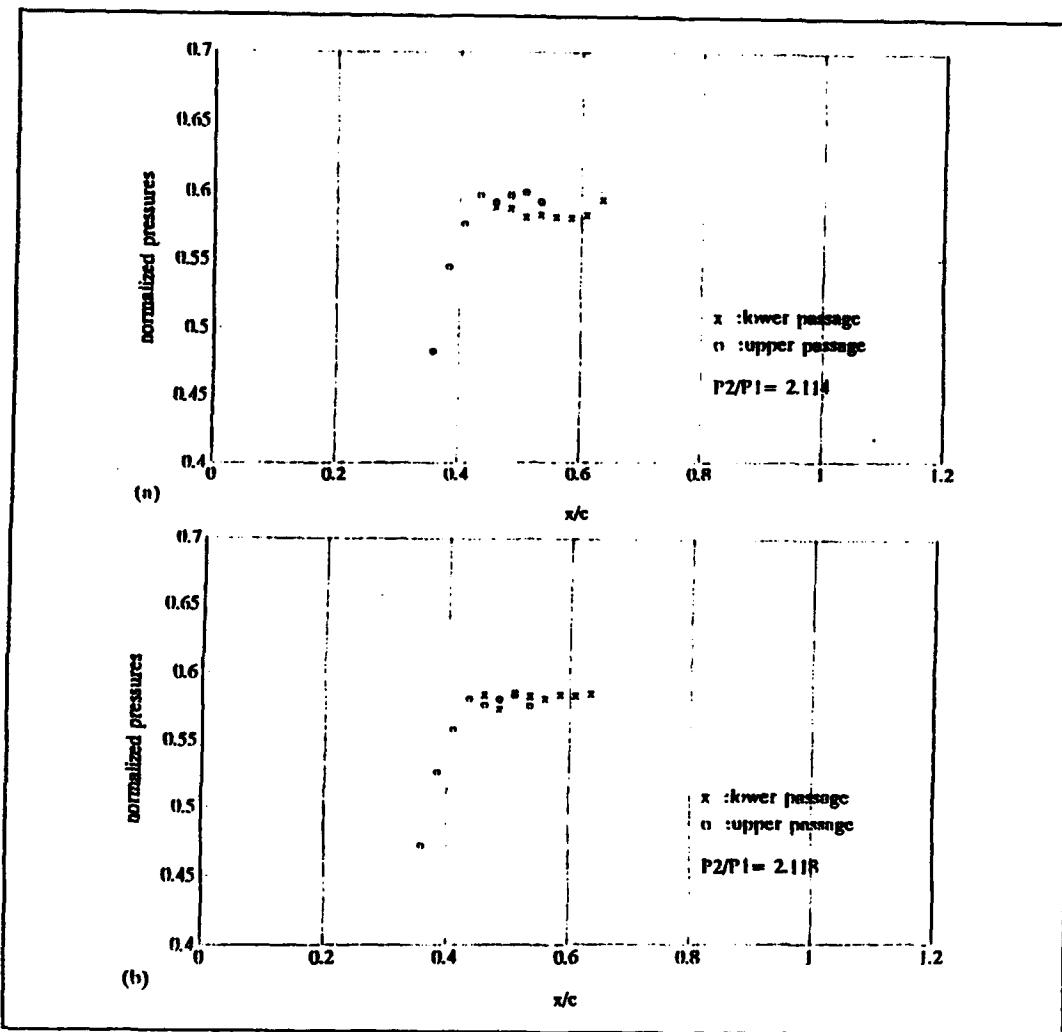
Figure 13. Left Sidewall Pressure Measurements; (a) Run 3, (b) Run 5 on 11-2-93

subsequent tests, both left- and right-hand sidewall pressure taps were installed and the SPDT was connected to taps on the right-hand sidewall. Figure 14 shows the first results

21

obtained for the left (Figure 14(a)) and right-hand (Figure 14(b)) sidewall pressure distributions. In these tests, the BPV was used to adjust the pressure ratio and the PBV was
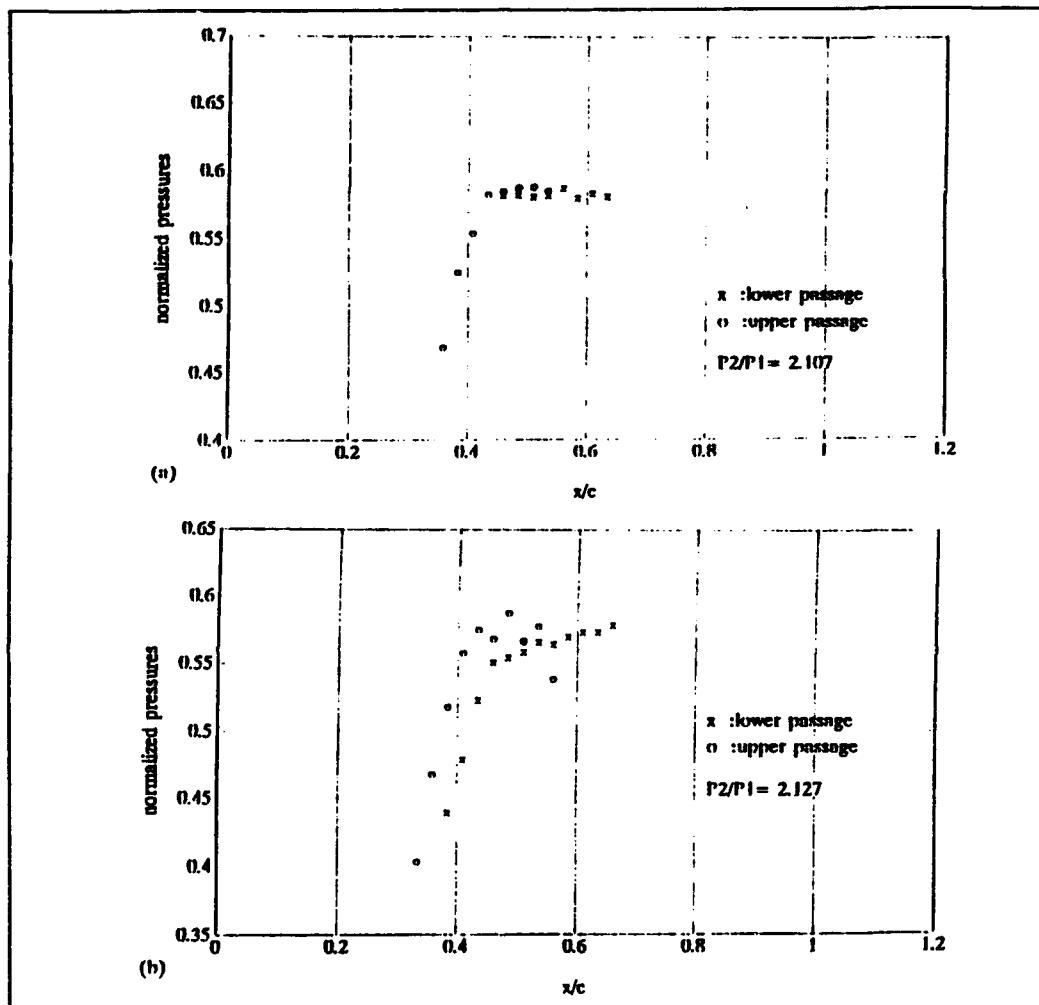
Figure 14. Sidewall Pressure Measurements; (a) Left (Run 1), (b) Right (Run 7) on 11-24-93

left positioned as before.

Unfortunately, only the right or left-hand sidewall pressures could be recorded in the same test because of an intermittent connection to ZOC #3 at that time. The plotted

22

data demonstrate that reasonable periodicity was achieved, but that the results were obtained at two slightly different pressure ratios (P2/P1 in Table 2). The upper passage distribution on the right-hand side suggests that an unwanted acceleration occurred downstream of the passage shock. It was noted that the SPDT output decreased from about 3.5 psid to -0.85 +/- 0.03 psid as the pressure ratio was increased by the adjustment of the BPV.

While the results appeared promising, the inability to achieve simultaneous left- and right-hand sidewall pressure measurements, caused by an intermittence in the data flow from ZOC #3, prevented a definitive test of periodicity. Prior to further experimental work, the ZOC #3 data cable was repaired and all channels were subsequently recorded.

In the test which followed, the PBV, BPV, AND BPBV were adjusted to minimize the output of the SPDT. The method was to set a P2/P1 of approximately 2.1 using the BPV, open the PBV to further reduce the SPTD reading toward zero, then throttle the BPBV to attain the SPDT output as close to zero as possible. The results in Figure 15, (a) and (b), show that outstanding pressure ratio (P2/P1) repeatability was achieved, but that P2/P1 was lower for both runs as compared to the previous tests, including tests with the windows installed. Also noteworthy was the degree of repeatability of the pressure in both passages.

23

Unfortunately, the distributions in Figure 15 (a) and
Figure 15 (b) show that a near-zero output of the SPDT did not
necessarily occur only when the shock structure was the same
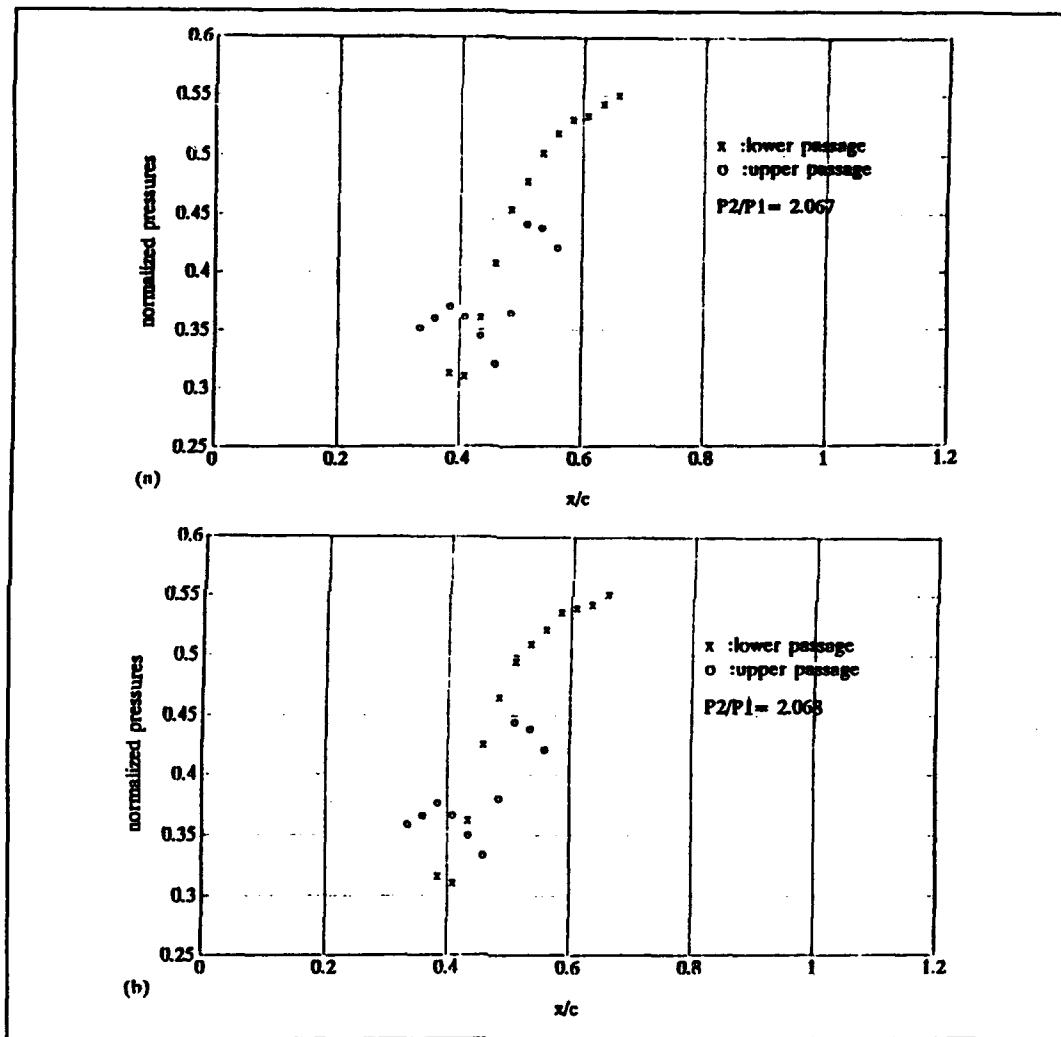
Figure 15. Right Sidewall Pressure Measurements; (a)
Run 1, (b) Run 6 on 12-01-93

in both upper and lower passages: the upper passage shock was
not a single normal shock and the lower passage shock was near
normal but too far downstream (near 0.5 of chord) when the two

static pressures at 0.43 chord were almost the same. While the shock pattern was not the desired one, the SPDT allowed the condition to be repeated readily. This is evident from the data in Figure 16, which shows both left- and right-hand sidewall pressure distributions of a later test. It can be seen from Figure 16(b) (right-hand window blank) that the shock structure was the same as in the tests shown in Figure 15; it was not, however, fully two-dimensional and departed significantly from being periodic.

The major difference between the tests resulting in Figure 16 and those resulting in Figure 14 was that the PBV had to be adjusted to almost wide open in order to achieve zero output from the SPDT. Thus, there would be increased outflow through the porous wall resulting in expansion waves from the upper nozzle wall entering the upper blade passage. This was a probable explanation for the weakened shock waves seen in the upper passage in Figure 16, (a) and (b).

Finally, in the attempt to obtain periodicity without visual access, a return was made to operating with a preset PBV and using only the BPV and BPBV to minimize the output of the SPDT. The results obtained are illustrated in Figure 17. The results can be compared with those in Figure 14 which were also obtained with the same fixed setting of the PBV, but with no attempt made to minimize the output of the SPDT. Thus, the pressure ratio was 2.013 in the test shown in Figure 17, and 2.107 and 2.127 for the tests in Figure 14(a) and Figure
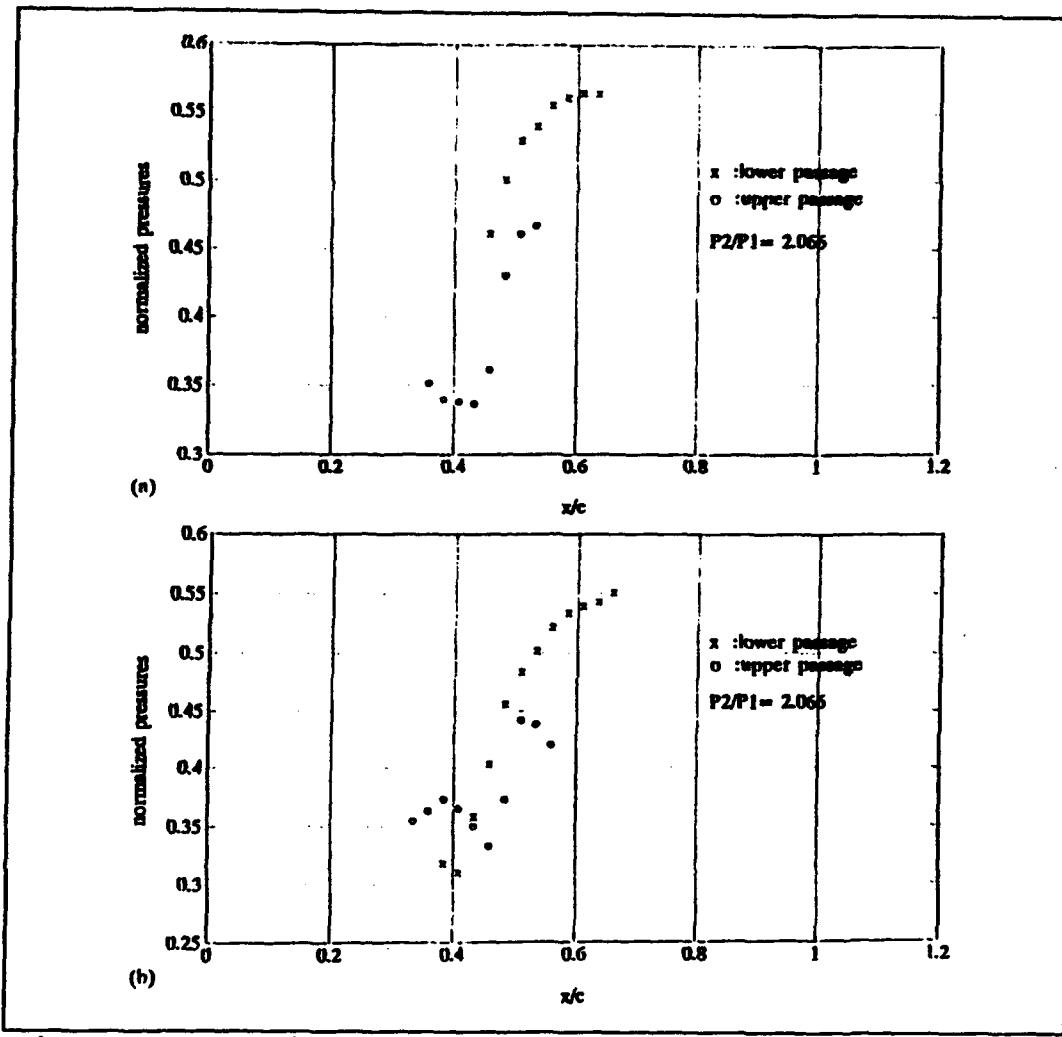
Figure 16. Sidewall Pressure Measurements; (a) Left, (b) Right in Run 8 on 12-01-93

14(b), respectively. First, there is seen to be a measurable difference in shock location in both sets of data (about 4 percent of chord, measured on the right-hand window blank). The shock in the lower passage is slightly farther forward at the lower pressure ratio shown in Figure 17. Also, the data distributions are smoother, clearly showing an expansion following the shock in the upper passage.

Lastly, Figure 18 shows the impact probe total pressure survey taken during the final experiment. The survey compares favorably with the previous wake surveys shown in section B
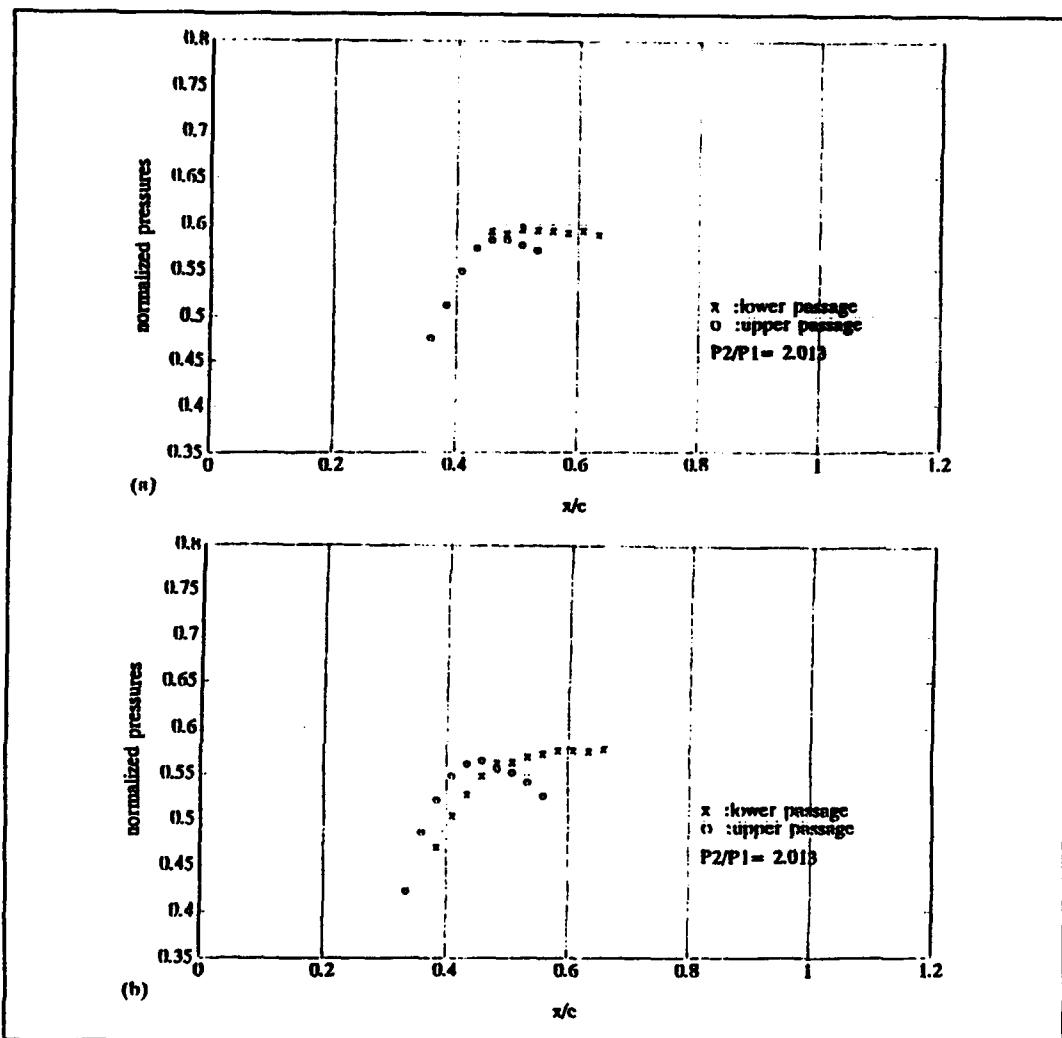
Figure 17. Sidewall Pressure Measurements; (a) Left, (b) Right in Run 3 on 12-06-93

(Figure 12). There was perhaps a more discernable difference in the level of shock loss in the upper and lower passages in Figure 18, and a larger perturbation near the beginning of the survey (top). The mass-averaged loss coefficient obtained for

the data in Figure 18 was 0.0943: this also compares well
with the previous results obtained when the tunnel was
operated with the windows installed (see run #8 in Table 2).
A complete listing of the data from the runs given in Table 2
and discussed here is given in Appendix D.
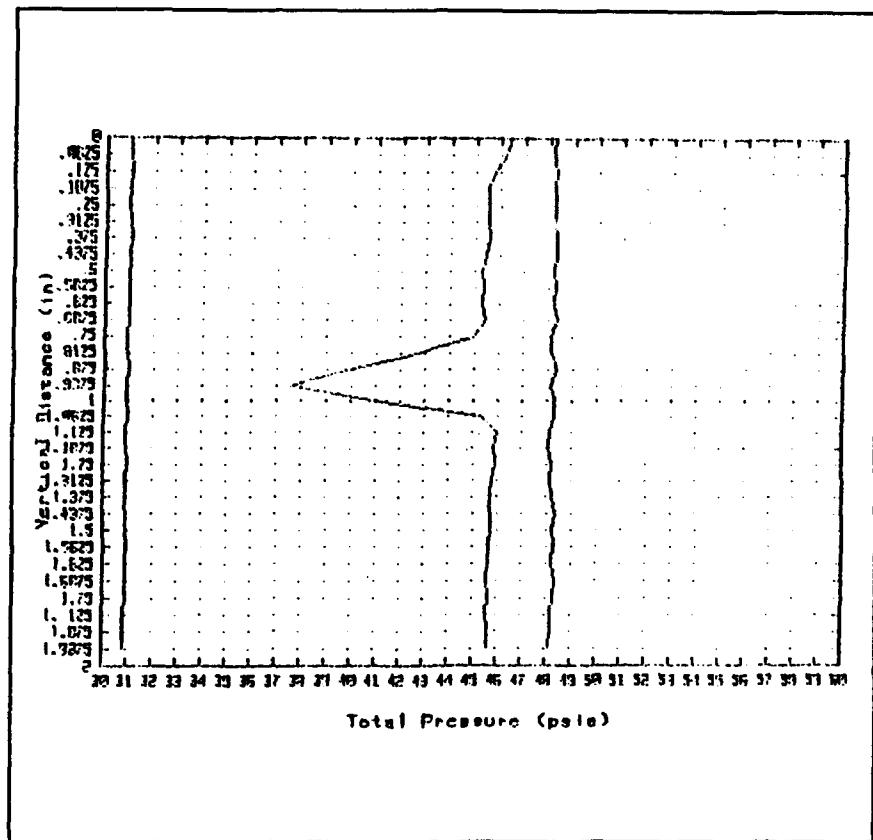
Figure 18.   Impact Probe Survey; Run 6 on
12-06-93

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

In the present study, losses due to shock boundary-layer interaction in a simulated fan-blade passage were measured at design incidence. Specifically, the loss coefficient in four consecutive tests was found to be 0.089 +/- 0.004.

To enable these measurements while attempting to show periodicity in sidewall static pressure, two additional ZOC-14 electronic pressure scanning modules were added to the data acquisition system, with an additional on-line calibration module, to record 96 pressure channels.

The following conclusions were drawn:

- Repeatable test conditions, with acceptable periodicity, based on shock position and impact pressure survey data, were demonstrated at design incidence when a shadowgraph system was used.

- Very fine control of pressure ratio (P2/P1) was possible using the BPBV. The approximate nulling of a single transducer, however, was not sufficient to ensure periodic shock structure and pressure distributions in the two passages, in the absence of the shadowgraph.

- Separation was shown to be present at the shock in the lower passage at design incidence, but to be absent at 2 degrees off-design incidence.

- The level of the wind tunnel plenum pressure was found to be critical in allowing the setting of both passage shocks, in the same chordwise position, in the two passages. A suitable value was found to be 33 psig.

B. Recommendations

The following recommendations are made concerning the apparatus, data acquisition system, and testing program:

- Install Plexiglas windows containing a row of pressure taps to allow simultaneous visual placement of the shocks and acquisition of sidewall pressure measurements.

- Install a valved transducer calibration system to reduce the associated wear and tear of removing and replacing pressure tubing on the individual differential transducers.

- Conduct calibrated, velocity probe surveys with angle sensitivity and with greater spatial resolution through the center blade wake to obtain a more precise measurement of the losses from the shock boundary-layer interaction.

- Complete an assessment of the effect of vortex generators in alleviating the losses.

APPENDIX A. ZOC-14 ADDITIONS

Two ZOC-14 enclosures were added, both with transducers having the range +/- 15 psi, and are referred to as ZOC #2 and ZOC #3. ZOC #2 was connected to the left-hand sidewall aluminum window blank and ZOC #3, to the right-hand window blank.

Figure A1 shows a drawing of the left window blank pressure tap locations and numbering scheme, and the x/c locations along the lower and upper passage from the blade leading edge. The flow direction is indicated. The vertical arrows on the right of the figure show the distances, in inches, above the lower and middle blade leading edges. The axes, x and y, are at the center of the thick aluminum side plates.

Figure A2 shows the right window blank and associated pressure tap assignments. Prior to the current work, the right window blank had 124 taps drilled into it and the tubing was grouped into three bundles labeled 2, 3, and 4: this is the reason for the hyphenated number designations. Also noteworthy in Figure A2 are pressure ports 4-26 and 3-30; 4-26 and 3-30 were connected to the SPDT low side and high side, respectively.

Table A1 shows the connections from the apparatus to the
. three ZOCs. Amplifying information for ZOC #1 may be found in
Myre [Ref. 3].
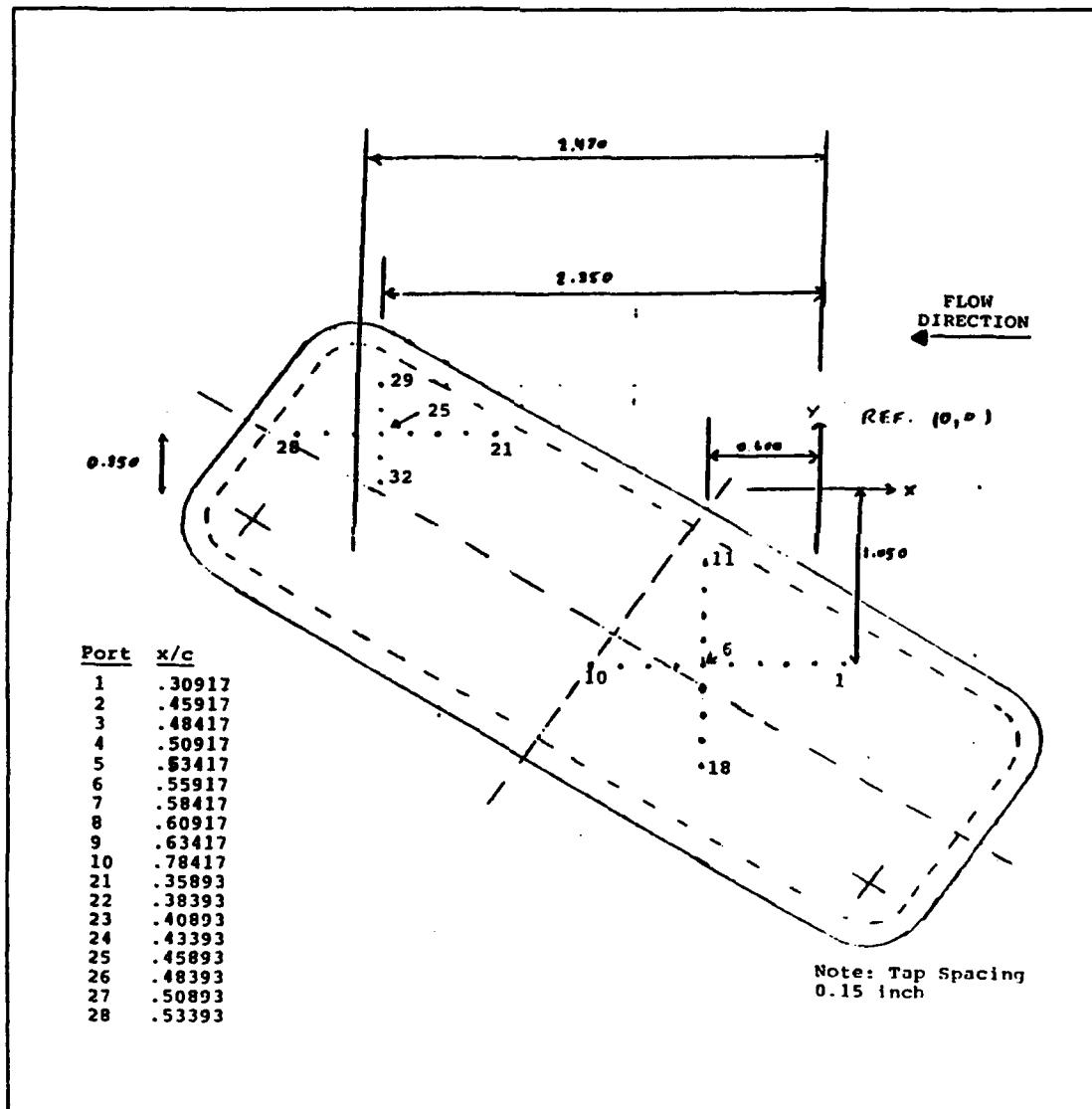
Figure A1. Left-Hand Window Blank Pressure Taps

Port	x/c
4-22	.33393
4-23	.35893
4-24	.38393
4-25	.40893
4-26	.43393
4-27	.45893
4-28	.48394
4-29	.50893
4-30	.53393
4-31	.55893

UPPER TAPS →
(41 HOLES)

FLOW DIRECTION

REF.
(0,0)

Port	x/c
3-28	.38417
3-29	.40917
3-30	.43417
3-31	.45917
3-32	.48417
3-33	.50917
3-34	.53417
3-35	.55917
3-36	.58417
3-37	.60917
3-38	.63417
3-39	.65917

LOWER TAPS
(81 HOLES)
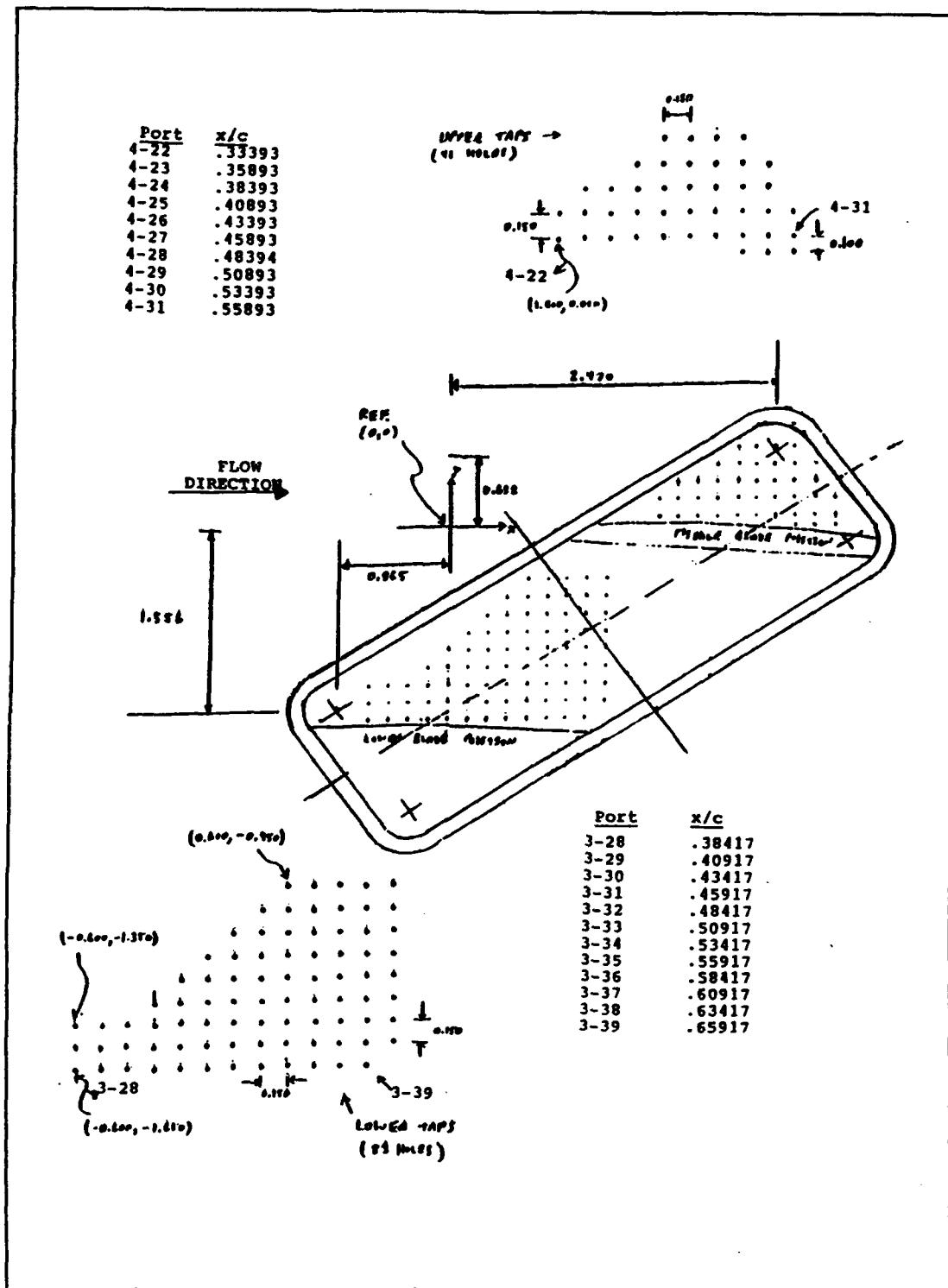
Figure A2. Right-Hand Window Blank Pressure Taps

33

Table A1. ZOC Connections

PORT #	ZOC #1	ZOC #2	ZOC #3
1	1	1	3-28
2	2	2	3-29
3	3	3	3-30
4	4	4	3-31
5	5	5	3-32
6	6	6	3-33
7	7	7	3-34
8	8	8	3-35
9	9	9	3-36
10	10	10	3-37
11	11	11	3-38
12	12	12	3-39
13	13	13	2-3
14	14	14	2-16
15	15	15	2-43
16	16	16	3-10
17	17	17	3-23
18	18	18	4-22
19	19	not used	4-23
20	20	not used	4-24
21	21	21	4-25
22	22	22	4-26
23	23	23	4-27
24	24	24	4-28
25	25	25	4-29
26	26	26	4-30
27	P3	27	4-31
28	28	28	4-41
29	P1	29	4-46
30	P2	30	4-8
31	Pt	31	4-17
32	Probe	32	not used

APPENDIX B. MODIFIED ACQUISITION PROGRAMS

1. Calibration Module #2 Initialization Program

When first installed, the second calibration module, CALMOD #2, did not work when addressed from the NEW_SCAN_ZOC acquisition program. In order to verify CALMOD #2, a program written by Wendland, CAL_READ_PR1, was used [Ref 5]. It was found at first that CAL_READ_PR1 caused CALMOD #1 to respond correctly, but this same program had no affect on CALMOD #2, even when CALMOD #2's interface address was directly substituted into the code. The unit was then returned to the manufacturer for testing and operational evaluation. In the interim, phone conversations with Wendland revealed his laborious effort, using a Modem software package, to communicate to CALMOD #1 using an IBM PC.

Upon its return, several modem software programs were used to try to access and communicate with CALMOD #2's micro-processor, but there was no response. Phone calls to the CALMOD's designer and software specialist eventually solved the problem.

The Programmable Read Only Memory (PROM) computer chips, as programmed by the manufacturer, were of the type that would not allow correct setting of the null prompt record, which was found by Wendland to be required if the unit was to communicate with the Hewlet Packard HP9000 computer [Ref. 5].

This was the cause of the incompatibility between the HP9000 and CALMOD #2.

The CALMOD's designer and software specialist corrected the problem by programming a new pair of PROM chips, that, once installed, gave the desired responses when commanded by the HP9000. With the new chips installed, CALMOD #1 and CALMOD #2 were sequentially addressed by NEW_SCAN_ZOC.

Figure B1 shows the modified version of Wendland's computer program (CAL_READ_PR1), renamed CAL_READ_PR2, that was used to exercise and verify CALMOD #2 in preparation for the present experiments.

2. Porous Bleed Valve (PBV) Upstream Pressure

Several lines of computer code were inserted in the data acquisition program NEW_SCAN_ZOC [Ref. 3]. This code, as shown in Figure B2, enabled the tunnel operator to monitor the PBV upstream Pressure (P3) during tunnel operations.

```
10    ! Program: CAL_READ_PR2
20    ! Description: program to operate CAL2000 calibration modes sequentially
30    !                and read corresponding calibration pressures in Hg as a
40    !                inst'ment for later inspection into the Zoc scanning programs
50    ! Author: Rici Wendland, Naval Postgraduate School, Monterey CA
60    !              Tele:(408) 656-2165
70    ! Modified by Eric Lapp, Oct 1993
80    CLEAR SCREEN
90    !PRINTER IS CRT
100   PRINT "Program: CAL_READ_PR2"
110   PRINT
120   PRINT "   This program sequentially sets the CAL2000 calibration"
130   PRINT "   modes and reads the corresponding internal Pressure Standard"
140   PRINT "   for that mode for CALMOD #2."
150   PRINT
160   PRINT "           PH           Positive high range pressure to CAL(+)"
170   PRINT "           PM           Positive mid range pressure to CAL(+)"
180   PRINT "           PL           Positive low range pressure to CAL(+)"
190   PRINT "           ZO           CAL(+) & REF(-) connected together"
200   PRINT "           NL           Negative low range pressure to REF(-)"
210   PRINT "           NM           Negative mid range pressure to REF(-)"
220   PRINT "           NH           Negative high range pressure to REF(-)"
230   !PRINT "Display results PRINTER? (1=PRINTER)"
240   INPUT "Display results PRINTER? (1=PRINTER)",Results
250   IF Results=1 THEN
260     PRINTER IS 702
270   END IF
280   CONTROL 9,5;3           !Set DTR & RTS to active for CAL2000 configuration
290   INTEGER Error,Value
300   REAL Pressure(1:7)
310   DIM Command_mode$(1:7)[3],Pressure(5)
320   Command_mode$(1)="2NH"
330   Command_mode$(2)="2NM"
340   Command_mode$(3)="2NL"
350   Command_mode$(4)="2ZO"
360   Command_mode$(5)="2PL"
370   Command_mode$(6)="2PM"
380   Command_mode$(7)="2PH"
390   ON ERROR GOTO Find_error
391   OUTPUT 9;"2SMON";CHR$(13);END
394   WAIT 1.5
400   OUTPUT 9;"2IC";CHR$(13);END           !Initialize CAL2000
410   WAIT 1.5
420 Send_command:  !
430   FOR I=1 TO 7
440     OUTPUT 9;Command_mode$(I);CHR$(13);END
450     WAIT 0.8        !Wait time to allow calibrator stabilization
460     OUTPUT 9;"2PR";CHR$(13);END
470     ENTER 9 USING "#,K,K";Pressure(I);Pressure
480     GOTO No_error
490 Find_error:  !
510     STATUS 9,6;Value
511     STATUS 9,10;Error
520     Error_code$=VAL$(Error,2)
530     PRINT "Register 10:       ";Error_code$[9,16]
540     PRINT "Register  6:       ";Value,CHR$(Value)
550 No_error:  !
560     !DISP "F2 TO CONTINUE"          !Steps used to determine wait time between
570     !PAUSE                          !CALMOD steps.  ZOC output connected to the
580     NEXT I                          !O-scope, use stopwatch to measure settling
590 Print_results:  !                  !time of dc voltage from ZOC.
600   PRINT   .
610   PRINT
620   PRINT "CAL2000: Calibration modes and pressures."
630   PRINT
640   PRINT USING "2X,K,5X,K";"Mode","Pressure (in Hg)"
650   PRINT
660   FOR I=1 TO 7
670     PRINT USING "3X,K,10X,3D.4D";Command_mode$(I),Pressure(I)
680   NEXT I
690 Finish:  !
700   PRINTER IS CRT
701   !PRINT "Press F2 to continue"
710   DISP "Press F2 to continue"
720   PAUSE
730   LOAD "ZOC MENU",10
740   END
```

Figure B1.   CAL_READ_PR2

37

```
3302  !
3303  !NOTE:   THE FOLLOWING IS THE Bleedratio CALCULATION AS
3304  !TAKEN FROM THE POROUS BLEED VALVE AIR FLOW
3305  !
3310 Ratio_loop: !
3311              Bleedratio=0
3312              Id=9
3313              GOSUB Read_stdy
3314              P3=P_stdy*1000+P_atm
3320              FOR Id=0 TO 4 STEP 4
3330              GOSUB Read_stdy
3340              SELECT Id
3350                CASE 0
3360                  P1=P_stdy*1000+P_atm
3370                CASE 4
3380                  P2=P_stdy*1000+P_atm
3390              END SELECT
3400              NEXT Id
3401              Bleedratio=P3/P1
3402              PRINT
3403              PRINT
3405              PRINT "  P3   "," P1  ","Bleedratio"
3406              PRINT P3,P1,Bleedratio
3407              PRINT
3410              Pratio=P2/P1
3420              PRINT "  P2   "," P1  ","Pratio"
3430              PRINT P2,P1,Pratio
3440 GOTO Ratio_loop
3450  !
3460 Read_stdy:  !
3470              CLEAR @Dacu
3480              Ac$="AC"
3490              Id$=VAL$(Id)
3500              OUTPUT @Dacu:Ac$&Id$
3510              Total=0
3520              FOR I=1 TO 5
3530                TRIGGER @Dvm
3540                ENTER @Dvm;P_stdy
3550                Total=Total+P_stdy
3560              NEXT I
3570              CLEAR @Dacu
3580              P_stdy=Total/5
3590              P_stdy=2*P_stdy          !Scaled for 100 psid transducer
3600              RETURN
```

Figure B2.   Modification of NEW_SCAN_ZOC for P3

APPENDIX C. ZOC-14 SOFTWARE USER'S GUIDE

With the integration of a second calibration module and two ZOC-14 enclosures, procedures for the operation of the instrumentation and acquisition system were modified. Myre [Ref. 3] provided a step-by-step operating guide, however, that was updated during the present work, to reflect the current tunnel operation.

1. Start-up

- Turn on the HP6944A, CALSYS 2000 CALMOD #1 and CALMOD #2, ZOC #1, ZOC #2, ZOC #3, HP3497A, HP3455A, AND HP9000.

- From "HP 9000 Series 300 Computer Data Acquisition/Reduction System" menu, type **F7**

- Type **F3** to enter "HP Multi-programmer (HP6944A) Operation Menu

- Type **F1** to enter "ZOC Electronic Pressure Module Operation Menu"

2. CALMOD #2 Initialization

NOTE: This and CALMOD #1 initialization (Step 3) should always be completed prior to a day's tunnel runs and after any files have been manipulated.

- Type **F4** ("Read CALSYS 2000 calibration pressures"). Open nitrogen bottle and throttle pressure to 110 psi with regulator valve. Type **1** and **"return"**.

NOTE: Both CALMOD's are set in inches of mercury. CALMOD #2 should provide calibrated pressures in the range of 30, 60, 90 percent of 50 psi to calibrate ZOC #1.

- Secure nitrogen.

- Press **F2** to enter "ZOC Electronic Pressure Module Operation Menu." Press **F7** to enter "HP Multiprogrammer (HP6944A) Operation Menu." Type **F7** to enter HP 9000 Series 300 Computer Data Acquisition/Reduction System" menu. Type **F2** to enter "HP Multi-Programmer (HP6944A) Operation Menu." Type **F1** to enter "ZOC Electronic Pressure Module Operation Menu."

3. **CALMOD #1 Initialization**

- Press **F4** ("Read CALSYS 2000 Calibration Pressures"). Set 110 psi on nitrogen regulator pressure gauge. Type **0** or **1** and **"return"**.

NOTE: CALMOD #1 should provide calibration in the range o f 30,60,90 percent of +/- 15 psi to calibrate ZOCs #2 and #3.

- Secure Nitrogen

- Press **F2** to enter "ZOC Electronic Pressure Module Operation Menu." Type **F1** to enter "HP Multi-programmer (HP6944A) Operation Menu."

4. **Calibration**

- Type **F2** to calibrate individual transducers. Select **0** and **"return"**, verify "000" channel on signal conditioner, "zero" P1 using upper knob; set 50.9 inches of mercury on the calibration standard, place pressure tube on P1 transducer and set lower knob of signal conditioner to one-half of the calibrator air pressure (+.0125). Press **4** and **"return"** and repeat the above for the P2 transducer. Finally, select **9** and **"return"**; zero P3 using upper knob on signal conditioner, set 10 inches of mercury on the calibration standard, place pressure tubing on P3 high

40

side and set P3 to one-half of the calibrator air pressure (+.0025). After calibration, type **11** and **"return"** to enter "HP Multi-programmer (HP6944A) Operation Menu."

- Type **F1** to enter "Zoc Electronic Pressure Module Operation Menu."

5. NEW_SCAN_ZOC Set-up

- Type **F1** ("Scan 1-3 ZOC-14 Modules (32 ports each)")

- Type **F3** to input set-up parameters to the program.

- Input atmospheric pressure in psia (e.g. 14.49), **"return"**

- Select data storage drive (**0** is hard drive ":,700" and **1** is floppy disk drive ":,700,1).

- Enter data sampling rate (330 Hz was chosen for the current work)

NOTE: The following input will determine the number of Z O C port scans. That is, **0** and **1** allow up to 32 ports per ZOC to be scanned, whereas **2** and **3** are set automatically at 32 ports per ZOC.

- Select **0** for single scan, **1** for multiple scans, **2** for lower blade probe survey, or **3** for middle blade probe survey; **"return"**.

WARNING If 2 or 3 was selected as the scan_type, ensure the probe traverse assembly is located in the correct position for that type of survey. That is, for a middle blade survey, it must be in the furthest downstream position, relative to the tunnel, that the mounting block will allow. Scan_type 2 may be chosen for the mounting block in either the upstream or downstream position.

- Select the number of samples per port (this prompt will appear only if scan_type **0** or **1** was selected), **"return."**

- Select number of ZOCs for recording data (ZOC #1 is connected to the lower blade, probe, P3; ZOC #2 to left-hand sidewall; ZOC #3 to right-hand sidewall), **"return"**.

6. **Data Collection Preparations**

- Set nitrogen pressure at 110 psi.

- Verify BPV is fully open.

- For scan_types **2** and **3**: verify probe traversal lead screw and side tracks are properly lubricated; turn probe traverse motor controller on (power light (red) only, on-line light (yellow) should illuminate only when traverse is moving).

NOTE: the next step is to type **F4** for final preparations and checklist, but the outcome will vary depending on scan_type selected. For scan_type of **0** or **1**: type **F4** p r i o r   t o commencing wind tunnel operations. For scan_type **2** or **3**, type **F4** just prior (30 seconds) to opening tunnel air supply valve. This will avoid placing the probe in unsteady initial tunnel flow.

7. **Data Collection**

- When tunnel pressure ratios (P2/P1 and P3/P1) are at a desired level, and, if applicable, the SPDT is set to the desired reading, type **F5** to commence data collection.

- The HP9000 will display "Raw data collection complete" and show raw and calibration data filenames.

- Secure nitrogen supply, turn off probe motor controller.

NOTE: The above raw and calibration data have been stored a files using an alphanumeric format. For example, the d a t a filename ZW1312061 represents raw data (ZW) from ZOC #(1) in the year 9(3), the (12)th month, the (06)th day and the (1)st run. Similarly, calibration data files start with the "ZC" prefix.

- To repeat the previous data run using the same user input parameters as before, type **F4**. To reset NEW_SCAN_ZOC to step 5, type **F3**. Type **F6** to reduce the data, or press **F8** to exit.

8. Data Reduction

- Type **F6** to reduce current day raw data. It is recommended that all data be reduced immediately after each run to assess the results and correct shock positioning, if necessary.

NOTE: When reduction is complete, the reduced data file will have the "ZR" prefix.

- Type **F8** to enter "Zoc Electronic Pressure Module Operation Menu."

9. Data Analysis

- Press **F2** ("Read reduced data from ZOC-14 module") to enter "READ ZOC DATA AND DISPLAY AS SHOWN" menu.

- Press **F1**. Input the ZOC information as prompted (i.e. **1,31206,1**), **"return"**. Input **0** or **1**, **"return."**

NOTE: Now that the reduced ZOC data have been read, **F3** will list pressures in psia, in columnar form, for that one ZOC.

Also, **F4** and **F5** only have meaning for ZOC #1 reduced data, since these keys produce lower blade survey and probe survey plots, respectively.

- Press **F3**. Choose **0** or **1**, **"return."**

- Press **F4** (ZOC #1 only) for lower blade static pressure distributions. Select **0** or **1**, **"return."** Enter **10** for "first of seven scans", **"return."** Enter **16** for "last of seven scans", **"return."** Enter **0** for "Think Jet" prompt, **"return."** After the graph appears, press **"shift-Dump Graph"** to get hard-copy. Press **F2**. Enter **N** at the prompt, **"return."**

- Type **F4** for Mach number. Complete the above sequence for hard-copy.

- Press **F5** (ZOC #1 only) for a probe pressure survey and mass-averaged losses. Enter **0** for "Think Jet" prompt, **"return."** Enter maximum temperature in degrees F, **"return."** Enter minimum temperature in degrees F, **"return."** Press **F2**. Wait for the plot to finish. Press **"shift-Dump Graph"** for hard-copy. Type **F2**. Input **N** to prompt, **"return."** Enter **0** or **1**, **"return"** for losses. Press **F2** to return to "READ ZOC DATA AND DISPLAY AS SHOWN" menu.

- Return to step 8 to obtain data for additional ZOCs.

- Press **F8** to enter "Zoc Electronic Pressure Module Operation Menu." Return to step 5 for additional tunnel runs.

- Press **F7** twice to discontinue tunnel runs and return to original screen "HP9000 Series 300 Computer Data Acquisition/Reduction System."

```
Data Print Out for Zoc # 1 , Run # 5 , FileZR1306255
    Period between samples (sec): .001
    Sample collection rate (Hz):  1000
    Number of samples per port:   10
    Length of data run (sec):     10.23
    The scan type is:             3
    Number of scans/traverses:    33
    Increment of traverse:        .0625   Inches
    Atmospheric pressure is:      14.71   psia
    Tunnel Pressure Ratio is:     2.0983049243
```

Scan	1	Port Number 2	3	4	5	6	7
1	14.623	14.345	14.612	14.842	16.565	18.948	20.262
2	14.650	14.410	14.612	14.787	16.237	18.929	20.730
3	14.677	14.392	14.575	14.906	16.465	19.189	20.712
4	14.713	14.512	14.713	14.796	15.634	18.448	20.400
5	14.623	14.401	14.630	14.851	16.364	18.716	20.409
6	14.677	14.457	14.621	14.897	16.264	18.842	20.345
7	14.668	14.438	14.584	14.769	15.990	18.939	20.767
8	14.632	14.392	14.630	14.760	15.607	17.578	19.950
9	14.632	14.401	14.593	14.778	15.817	18.439	20.290
10	14.659	14.420	14.603	14.815	15.963	18.679	20.537
11	14.587	14.383	14.584	14.778	16.149	18.901	20.519
12	14.677	14.429	14.612	14.750	15.470	18.031	20.005
13	14.677	14.420	14.830	14.805	16.310	19.022	20.519
14	14.623	14.373	14.603	14.842	15.963	18.661	20.565
15	14.686	14.438	14.639	14.750	15.288	17.402	19.684
16	14.659	14.429	14.566	14.732	15.853	18.337	20.133
17	14.605	14.373	14.603	14.705	15.799	18.633	20.629
18	14.632	14.401	14.548	14.778	15.717	17.439	19.353
19	14.569	14.355	14.548	14.824	16.100	18.513	20.436
20	14.668	14.429	14.639	14.760	15.780	18.578	20.537
21	14.596	14.383	14.575	14.750	16.237	18.985	20.840
22	14.650	14.392	14.593	14.732	16.218	18.689	20.143
23	14.632	14.373	14.584	14.787	16.063	18.402	19.987
24	14.605	14.429	14.575	14.723	15.653	18.578	20.537
25	14.605	14.383	14.593	15.016	16.793	18.348	20.537
26	14.614	14.438	14.548	14.796	16.119	18.596	20.308
27	14.605	14.401	14.603	14.723	16.136	19.355	21.051
28	14.614	14.383	14.603	14.732	15.799	18.541	20.381
29	14.677	14.447	14.612	14.879	16.008	18.652	20.620
30	14.641	14.327	14.557	14.778	16.182	18.846	20.565
31	14.596	14.364	14.593	14.925	16.729	19.596	21.116
32	14.659	14.447	14.612	14.906	16.300	19.050	20.758
33	14.605	14.383	14.603	14.842	16.401	18.976	20.611

Figure D1.   Run 5, 6-25-93, ZOC #1 (Raw Data)

Scan	8	Port Number 9	10	11	12	13	14
1	21.594	22.626	23.275	23.891	24.372	24.933	25.226
2	21.820	22.803	23.398	23.926	24.416	24.870	25.097
3	21.630	22.414	23.116	23.776	24.399	24.888	25.260
4	21.450	22.184	22.983	23.634	24.213	24.817	25.200
5	21.576	22.511	23.231	23.873	24.487	24.924	25.294
6	21.693	22.484	23.328	23.918	24.505	24.853	25.157
7	21.748	22.316	23.028	23.607	24.204	24.719	25.123
8	21.062	22.024	22.913	23.687	24.213	24.620	25.046
9	21.594	22.458	23.160	23.776	24.284	24.701	24.986
10	21.784	22.458	23.204	23.776	24.248	24.656	24.969
11	21.540	22.192	22.904	23.554	24.098	24.469	24.789
12	21.368	22.369	23.054	23.643	24.177	24.531	24.969
13	21.540	22.325	22.975	23.510	24.089	24.558	24.952
14	21.991	22.927	23.498	23.900	24.222	24.621	24.849
15	21.296	22.431	23.213	23.935	24.540	24.924	25.209
16	21.359	22.157	23.010	23.554	24.133	24.540	24.823
17	21.793	22.617	23.275	23.873	24.284	24.719	24.986
18	20.854	21.839	22.701	23.350	23.974	24.558	25.003
19	21.711	22.564	23.284	23.731	24.160	24.540	24.806
20	21.829	22.653	23.248	23.847	24.292	24.701	24.977
21	21.892	22.936	23.425	24.069	24.399	24.944	25.106
22	21.206	22.192	23.036	23.740	24.399	24.908	25.217
23	21.008	21.918	22.639	23.385	23.912	24.513	24.951
24	21.711	22.582	23.186	23.758	24.248	24.594	24.934
25	21.585	22.555	23.038	23.651	24.133	24.406	24.737
26	21.549	22.254	22.939	23.430	24.000	24.513	24.926
27	21.937	22.520	23.133	23.793	24.337	24.754	25.046
28	21.486	22.184	23.019	23.554	24.000	24.567	24.866
29	21.811	22.617	23.354	23.980	24.345	24.853	25.054
30	21.477	22.033	22.754	23.376	23.912	24.406	24.917
31	22.172	22.785	23.496	23.928	24.248	24.754	25.063
32	21.955	22.723	23.363	23.740	24.089	24.612	25.046
33	21.856	22.564	23.222	23.900	24.177	24.692	25.037

Figure D1. (cont) Run 5, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number						
	15	16	17	18	19	20	21
1	25.382	25.646	25.755	25.683	25.953	26.095	26.139
2	25.294	25.427	25.602	25.761	25.969	26.069	26.139
3	25.426	25.716	25.738	25.812	25.919	25.999	26.105
4	25.567	25.637	25.773	25.942	26.103	26.183	26.164
5	25.567	25.594	25.747	25.899	25.986	26.069	26.232
6	25.400	25.655	25.755	25.795	25.978	26.026	26.156
7	25.417	25.532	25.764	25.752	25.986	26.052	26.020
8	25.276	25.506	25.687	25.787	26.044	26.165	26.147
9	25.241	25.410	25.560	25.674	25.969	25.999	26.139
10	25.188	25.445	25.534	25.683	25.936	26.026	26.198
11	25.144	25.296	25.406	25.688	25.836	25.886	26.037
12	25.241	25.454	25.646	25.631	25.969	26.009	26.147
13	25.294	25.489	25.593	25.692	26.011	26.078	26.190
14	25.135	25.410	25.593	25.623	25.811	25.956	26.130
15	25.408	25.497	25.636	25.588	25.961	25.842	26.071
16	25.056	25.270	25.593	25.631	25.969	25.947	26.147
17	25.294	25.559	25.593	25.718	25.853	25.999	26.011
18	25.338	25.480	25.730	25.778	26.011	25.973	26.207
19	25.074	25.375	25.619	25.640	25.944	25.947	26.088
20	25.223	25.331	25.508	25.831	25.844	25.982	26.173
21	25.373	25.541	25.636	25.752	25.886	26.026	26.096
22	25.461	25.541	25.687	25.769	26.011	26.069	26.181
23	25.232	25.392	25.516	25.697	25.836	25.895	26.054
24	25.267	25.418	25.645	25.640	25.936	25.903	26.122
25	25.047	25.313	25.627	25.668	25.986	25.973	26.020
26	25.259	25.427	25.704	25.743	25.986	26.026	26.122
27	25.329	25.410	25.534	25.674	26.003	26.034	26.122
28	25.259	25.497	25.662	25.743	25.994	25.991	26.199
29	25.232	25.427	25.593	25.700	25.969	26.130	26.105
30	25.206	25.550	25.879	25.769	26.019	26.017	26.113
31	25.382	25.515	25.764	25.812	26.019	26.095	26.130
32	25.453	25.524	25.738	25.821	26.011	26.095	26.215
33	25.250	25.436	25.610	25.718	25.919	25.982	26.028

Figure D1. (cont) Run 5, 6-25-93, ZOC #1 (Raw Data)

47

Scan	22	Port Number 23	24	25	26	27	28
1	26.365	26.892	28.155	29.676	21.774	23.564	21.677
2	26.356	26.795	28.250	29.659	21.502	23.506	21.509
3	26.208	26.874	28.113	29.634	21.604	23.473	21.651
4	26.347	26.900	28.215	29.735	21.485	23.431	21.173
5	26.347	26.953	28.233	29.785	21.927	23.556	21.878
6	26.426	26.900	28.284	29.844	21.842	23.606	21.727
7	26.225	26.822	28.258	29.667	21.545	23.498	21.593
8	26.260	26.874	28.207	29.659	21.460	23.431	21.425
9	26.295	26.900	28.104	29.659	21.477	23.372	21.391
10	26.295	26.962	28.181	29.726	21.672	23.581	21.576
11	26.312	26.752	28.190	29.659	21.303	23.431	21.350
12	26.321	26.857	28.138	29.760	21.468	23.364	21.282
13	26.286	26.848	28.164	29.692	21.485	23.406	21.375
14	26.234	26.813	28.198	29.667	21.324	23.389	21.148
15	28.173	26.848	28.113	29.625	21.120	23.239	21.056
16	26.199	26.787	28.053	29.566	21.256	23.372	21.241
17	26.138	26.752	28.061	29.541	21.332	23.322	21.106
18	26.269	26.857	28.138	29.634	21.528	23.423	21.400
19	26.164	26.839	28.061	29.600	21.145	23.714	21.232
20	26.208	26.795	28.095	29.642	21.332	23.514	21.651
21	26.164	26.760	28.155	29.575	21.468	23.406	21.400
22	26.374	26.839	28.095	29.675	21.477	23.423	21.358
23	26.243	26.857	28.173	29.743	21.629	23.414	21.509
24	26.356	26.918	28.275	29.709	21.757	23.573	21.944
25	26.199	26.787	28.121	29.608	21.459	23.431	21.484
26	26.260	26.865	28.275	29.709	21.791	23.581	21.970
27	26.321	26.874	28.104	29.642	21.604	23.581	21.719
28	26.190	26.893	28.250	29.726	21.699	23.448	21.593
29	26.365	26.988	28.173	29.634	21.545	23.456	21.542
30	26.295	26.813	28.130	29.617	21.460	23.389	21.467
31	26.321	26.909	28.095	29.634	21.672	23.648	21.903
32	26.382	26.997	28.164	29.684	21.613	23.498	21.551
33	26.190	26.900	28.104	29.650	21.443	23.406	21.610

Figure D1. (cont) Run 5, 6-25-93, ZOC #1 (Raw Data)

48

Scan		Port Number		
	29	30	31	32
1	14.737	30.923	46.638	44.749
2	14.762	30.983	46.601	44.775
3	14.720	30.854	46.647	44.653
4	14.812	31.068	46.819	44.679
5	14.737	30.906	46.673	44.333
6	14.762	30.966	46.707	44.246
7	14.754	30.974	46.759	44.177
8	14.754	30.957	46.724	44.229
9	14.754	30.957	46.586	44.220
10	14.762	30.923	46.759	44.307
11	14.754	30.889	46.578	44.281
12	14.729	30.940	46.767	44.636
13	14.737	30.906	46.681	44.419
14	14.762	30.957	46.750	42.370
15	14.795	30.940	46.664	38.166
16	14.737	30.906	46.690	35.478
17	14.745	30.837	46.517	38.210
18	14.779	30.889	46.664	43.152
19	14.729	30.897	46.630	44.411
20	14.720	30.812	46.578	44.376
21	14.712	30.872	46.526	44.255
22	14.754	30.914	46.724	44.307
23	14.712	30.837	46.604	44.107
24	14.762	30.914	46.767	44.177
25	14.687	30.803	46.492	44.012
26	14.737	30.906	46.621	44.072
27	14.745	30.863	46.612	44.003
28	14.762	30.872	46.673	44.081
29	14.745	30.897	46.710	44.107
30	14.754	30.897	46.630	44.116
31	14.720	30.794	46.578	44.038
32	14.770	30.837	46.716	44.012
33	14.754	30.837	46.686	43.934

Figure D1. (cont) Run 5, 6-25-93, ZOC #1 (Raw Data)

Unnormalized Pressure vs. Percent Chord

Port

Scan Number

Port	10	11	12	13	14	15	16
1	.313	.313	.314	.314	.313	.315	.314
2	.308	.309	.309	.309	.307	.309	.309
3	.312	.313	.312	.313	.312	.314	.312
4	.317	.317	.315	.317	.317	.316	.316
5	.341	.347	.331	.349	.341	.328	.340
6	.399	.406	.386	.407	.399	.373	.393
7	.439	.441	.428	.440	.440	.422	.431
8	.466	.462	.457	.461	.470	.456	.457
9	.480	.476	.478	.478	.490	.481	.475
10	.496	.492	.493	.492	.503	.497	.493
11	.508	.506	.506	.504	.511	.513	.504
12	.519	.517	.517	.516	.518	.526	.517
13	.527	.525	.525	.526	.527	.534	.526
14	.534	.532	.534	.535	.532	.540	.532
15	.539	.540	.540	.542	.538	.544	.537
16	.544	.543	.544	.546	.544	.546	.541
17	.546	.545	.548	.548	.547	.549	.549
18	.549	.549	.548	.550	.548	.548	.549
19	.555	.555	.555	.557	.552	.556	.556
20	.557	.556	.556	.559	.555	.554	.556
21	.560	.559	.559	.561	.559	.559	.560
22	.562	.565	.563	.563	.561	.561	.561
23	.577	.574	.574	.575	.574	.575	.574
24	.603	.605	.602	.603	.603	.602	.601
25	.636	.637	.636	.636	.635	.635	.633

Figure D1. (cont) Run 5, 6-25-93, ZOC #1 (Lower Blade Pressure Distribution)

50
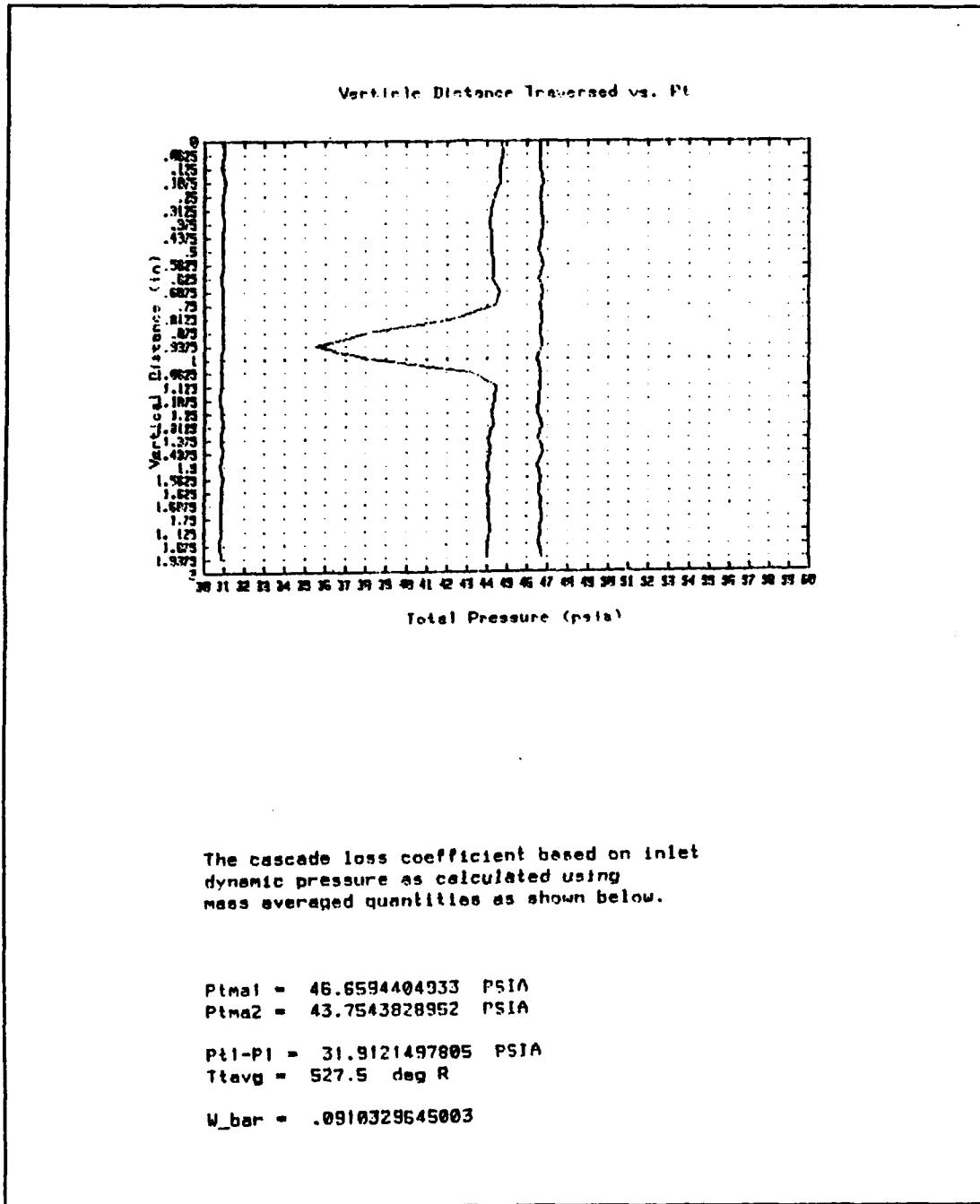
Figure D1. (cont) Run 5, 6-25-93, ZOC #1 (Impact Probe Survey)

Data Print Out for Zoc # 1 , Run # 6 , File2013B6256
    Period between samples (sec): .001
    Sample collection rate (Hz): 1000
    Number of samples per port: 10
    Length of data run (sec): 10.23
    The scan type is: 3
    Number of scans/traverses: 33
    Increment of traverse: .0625 Inches
    Atmospheric pressure is: 14.71 psia
    Tunnel Pressure Ratio is: 2.09439888983

Scan			Port Number				
	1	2	3	4	5	6	7
1	14.614	14.431	14.645	15.403	17.806	20.235	21.469
2	14.650	14.459	14.626	14.936	16.876	19.273	20.926
3	14.641	14.422	14.626	14.900	17.067	19.634	21.184
4	14.632	14.394	14.663	15.230	17.578	19.606	20.899
5	14.695	14.496	14.635	15.010	16.894	19.430	21.101
6	14.749	14.533	14.681	15.119	17.277	19.846	21.239
7	14.677	14.496	14.635	14.936	16.757	19.162	20.778
8	14.704	14.533	14.718	14.909	16.191	18.496	20.043
9	14.740	14.542	14.718	14.955	17.031	19.587	21.000
10	14.740	14.561	14.681	15.083	17.040	19.273	20.890
11	14.677	14.533	14.663	15.019	16.912	19.624	21.203
12	14.767	14.505	14.709	14.991	16.575	19.347	21.083
13	14.749	14.561	14.709	15.129	16.675	19.338	20.816
14	14.749	14.552	14.672	14.845	16.246	19.245	21.083
15	14.804	14.542	14.745	15.055	16.766	19.513	21.055
16	14.731	14.579	14.709	14.909	16.347	19.153	20.715
17	14.767	14.561	14.718	15.065	16.912	19.615	21.101
18	14.722	14.589	14.727	15.183	17.122	20.013	21.561
19	14.795	14.505	14.681	15.166	17.405	20.022	21.534
20	14.786	14.533	14.764	15.129	18.994	19.615	20.899
21	14.722	14.524	14.690	14.955	16.894	19.606	21.055
22	14.759	14.514	14.736	15.174	17.259	19.643	21.055
23	14.749	14.477	14.681	15.183	17.460	20.022	21.313
24	14.695	14.542	14.736	15.119	17.177	19.587	21.230
25	14.777	14.570	14.736	15.074	17.049	19.624	21.092
26	14.777	14.552	14.727	14.991	16.547	19.291	21.019
27	14.740	14.514	14.736	15.101	17.359	19.735	21.405
28	14.813	14.635	14.681	15.174	17.104	19.798	21.203
29	14.795	14.496	14.690	15.202	17.350	19.800	21.276
30	14.668	14.561	14.718	15.046	18.976	19.587	21.322
31	14.786	14.533	14.756	15.110	17.195	19.421	20.779
32	14.767	14.598	14.745	15.101	17.095	19.856	21.295
33	14.795	14.598	14.773	15.220	17.487	19.819	21.046

Figure D2. Run 6, 6-25-93, ZOC #1 (Raw Data)

52

Scan	Port Number						
	8	9	10	11	12	13	14
1	22.307	23.136	23.836	24.268	24.779	25.062	25.247
2	21.875	22.657	23.404	24.064	24.576	24.920	25.418
3	22.226	22.905	23.510	24.126	24.594	25.026	25.375
4	21.866	22.578	23.227	23.727	24.259	24.920	25.315
5	22.055	22.817	23.518	24.055	24.506	24.973	25.152
6	22.118	23.047	23.827	24.241	24.629	25.151	25.409
7	21.803	22.631	23.333	23.922	24.426	24.857	25.435
8	21.371	22.480	23.351	24.020	24.594	24.991	25.435
9	21.920	22.861	23.465	24.020	24.558	25.124	25.546
10	21.704	22.861	23.589	24.215	24.744	25.133	25.503
11	22.055	22.861	23.562	24.153	24.647	24.973	25.272
12	22.289	23.020	23.677	24.161	24.717	25.160	25.426
13	22.046	22.843	23.333	23.931	24.285	24.679	25.015
14	22.217	22.985	23.465	24.064	24.488	24.911	25.281
15	21.947	22.710	23.342	23.886	24.488	24.839	25.358
16	21.911	22.631	23.236	23.815	24.329	24.733	25.169
17	21.866	22.666	23.316	23.913	24.462	24.946	25.366
18	22.442	23.056	23.624	23.976	24.523	24.857	25.195
19	22.316	22.985	23.659	24.197	24.673	24.955	25.332
20	21.848	22.755	23.465	24.020	24.594	25.133	25.555
21	22.019	22.843	23.571	24.037	24.664	25.090	25.478
22	22.028	22.622	23.430	24.028	24.585	25.080	25.375
23	22.091	22.684	23.236	23.833	24.312	24.750	25.169
24	22.181	23.251	23.862	24.312	24.920	25.151	25.546
25	21.911	22.657	23.360	23.824	24.400	24.929	25.349
26	21.958	22.719	23.580	24.064	24.567	25.035	25.358
27	22.073	22.728	23.465	24.135	24.629	25.142	25.555
28	22.190	22.932	23.554	24.215	24.699	25.053	25.409
29	22.208	22.888	23.430	24.011	24.506	24.964	25.375
30	22.199	22.958	23.554	24.268	24.708	25.044	25.461
31	21.875	22.498	23.298	23.790	24.373	24.991	25.272
32	22.379	23.065	23.669	24.303	24.735	25.178	25.529
33	22.127	22.604	23.271	23.904	24.461	24.946	25.426

Figure D2. (cont) Run 6, 6-25-93, ZOC #1 (Raw Data)

53

Scan	Port Number						
	15	16	17	18	19	20	21
1	25.555	25.677	25.689	25.945	26.137	26.258	26.458
2	25.687	25.720	25.961	26.049	26.146	26.468	26.424
3	25.511	25.703	25.825	25.954	26.229	26.380	26.487
4	25.564	25.921	25.995	26.144	26.279	26.354	26.390
5	25.511	25.729	25.800	25.929	26.213	26.267	26.433
6	25.767	25.860	26.012	26.195	26.354	26.415	26.501
7	25.705	25.991	26.072	26.264	26.338	26.547	26.560
8	25.573	25.816	25.893	26.092	26.213	26.380	26.475
9	25.775	25.987	25.987	26.066	26.229	26.442	26.348
10	25.740	25.869	25.978	26.144	26.246	26.389	26.441
11	25.591	25.755	25.774	25.988	26.246	26.485	26.543
12	25.705	25.816	26.046	26.023	26.296	26.380	26.501
13	25.221	25.493	25.783	25.988	26.204	26.450	26.484
14	25.538	25.703	25.868	26.040	26.171	26.380	26.416
15	25.599	25.895	25.859	26.126	26.238	26.407	26.416
16	25.450	25.834	25.936	26.126	26.238	26.468	26.526
17	25.520	25.825	25.817	26.075	26.238	26.468	26.424
18	25.379	25.589	25.740	25.945	26.062	26.328	26.475
19	25.591	25.755	25.944	26.040	26.171	26.302	26.509
20	25.872	26.061	26.242	26.290	26.404	25.503	26.518
21	25.608	25.825	25.808	26.014	26.137	26.328	26.416
22	25.661	25.816	26.004	26.023	26.238	26.529	26.501
23	25.476	25.685	25.868	26.083	26.204	26.433	26.518
24	25.687	25.956	25.978	26.169	26.313	26.424	26.594
25	25.661	25.895	25.995	26.204	26.363	26.564	26.594
26	25.591	25.904	25.970	26.092	26.213	26.503	26.441
27	25.811	25.983	26.021	26.152	26.288	26.450	26.518
28	25.714	25.799	25.944	26.169	26.271	26.538	26.441
29	25.723	25.956	26.072	26.161	26.354	26.564	26.569
30	25.599	25.729	25.919	25.963	26.321	26.573	26.637
31	25.626	25.860	25.961	26.092	26.246	26.555	26.441
32	25.687	25.974	26.029	26.187	26.321	26.538	26.620
33	25.652	25.930	25.981	26.161	26.421	26.590	26.543

Figure D2. (cont) Run 6, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number						
	22	23	24	25	26	27	28
1	26.420	27.024	28.278	29.802	22.129	23.847	22.094
2	26.586	27.067	28.372	29.852	22.189	23.722	21.918
3	26.578	27.041	28.295	29.881	22.104	23.705	22.027
4	26.508	27.032	28.372	29.886	22.155	23.847	22.281
5	26.639	27.085	28.372	29.836	21.798	23.789	21.733
6	26.691	27.269	28.509	30.079	22.375	24.056	22.320
7	26.726	27.190	28.535	29.987	22.256	23.814	22.010
8	26.612	27.146	28.389	29.852	21.841	23.563	21.675
9	26.490	27.085	28.441	29.970	21.731	23.572	21.625
10	26.735	27.138	28.406	29.936	22.097	23.956	22.136
11	26.735	27.138	28.526	29.936	22.146	23.764	22.027
12	26.647	27.138	28.415	30.046	21.960	23.806	21.834
13	26.534	27.216	28.432	30.021	21.756	23.647	21.809
14	26.639	27.138	28.458	30.029	21.892	23.697	21.859
15	26.543	27.111	28.415	29.970	21.824	23.622	21.650
16	26.612	27.225	28.475	30.079	22.112	23.989	22.236
17	26.735	27.243	28.544	30.096	21.985	23.891	22.119
18	26.639	27.085	28.424	29.928	21.858	23.847	21.968
19	26.656	27.181	28.587	30.088	22.197	23.981	22.219
20	26.647	27.164	28.561	30.029	22.307	24.081	22.512
21	26.604	27.129	28.484	29.987	22.036	23.822	21.918
22	26.726	27.243	28.578	30.113	21.985	23.806	22.094
23	26.508	27.094	28.458	29.920	21.722	23.672	21.666
24	26.700	27.225	28.535	29.995	22.231	23.906	22.127
25	26.805	27.304	28.689	30.063	22.477	24.023	22.337
26	26.717	27.208	28.501	30.029	22.044	23.981	22.018
27	26.578	27.199	28.475	30.046	22.138	23.822	22.035
28	26.735	27.252	28.518	30.088	22.155	23.964	22.110
29	26.752	27.278	28.552	30.046	22.206	23.923	22.177
30	26.735	27.287	28.501	30.155	22.155	23.881	22.035
31	26.691	27.190	28.492	30.004	22.155	23.914	22.127
32	26.578	27.313	28.621	30.206	22.299	23.931	22.370
33	26.691	27.304	28.578	30.172	22.172	24.006	22.270

Figure D2. (cont) Run 6, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	14.790	30.977	46.749	44.924
2	14.932	31.036	46.758	44.959
3	14.807	31.045	46.595	44.881
4	14.840	31.105	46.689	44.838
5	14.840	31.173	46.861	44.839
6	14.849	31.207	46.912	44.586
7	14.857	31.190	46.878	44.439
8	14.857	31.173	46.938	44.465
9	14.932	31.284	47.066	44.673
10	14.890	31.182	46.921	44.526
11	14.865	31.199	46.904	44.500
12	14.915	31.267	47.058	44.760
13	14.890	31.224	47.041	44.907
14	14.915	31.190	47.075	44.638
15	14.865	31.156	47.015	42.364
16	14.907	31.267	47.023	38.502
17	14.941	31.267	47.135	35.900
18	14.874	31.182	46.912	38.694
19	14.890	31.241	47.083	43.754
20	14.915	31.224	46.989	44.725
21	14.882	31.122	46.955	44.768
22	14.915	31.259	47.161	44.820
23	14.874	31.207	46.998	44.838
24	14.874	31.216	46.946	44.526
25	14.915	31.250	47.092	44.586
26	14.924	31.250	47.126	44.612
27	14.932	31.190	47.092	44.526
28	14.915	31.233	47.109	44.543
29	14.924	31.224	47.109	44.586
30	14.915	31.224	47.109	44.578
31	14.924	31.250	47.075	44.552
32	14.949	31.199	47.169	44.560
33	14.924	31.276	47.169	44.595

Figure D2. (cont) Run 6, 6-25-93, ZOC #1 (Raw Data)

Normalized Pressure vs. Percent Chord

Port	Scan Number						
	10	11	12	13	14	15	16
1	.314	.313	.314	.314	.313	.315	.313
2	.310	.310	.308	.310	.309	.309	.310
3	.313	.313	.313	.313	.312	.314	.313
4	.321	.320	.319	.322	.315	.320	.317
5	.363	.361	.352	.354	.345	.357	.348
6	.411	.418	.411	.411	.409	.415	.407
7	.445	.452	.448	.443	.448	.448	.441
8	.463	.470	.474	.469	.472	.467	.466
9	.487	.487	.489	.486	.488	.483	.481
10	.503	.502	.503	.496	.498	.496	.494
11	.516	.515	.513	.509	.511	.508	.506
12	.527	.525	.525	.516	.520	.521	.517
13	.536	.532	.535	.525	.529	.528	.526
14	.544	.539	.540	.532	.537	.539	.535
15	.549	.546	.546	.536	.542	.544	.541
16	.551	.549	.549	.542	.546	.551	.549
17	.554	.550	.553	.548	.550	.550	.552
18	.557	.554	.553	.552	.553	.556	.556
19	.559	.560	.559	.557	.556	.558	.558
20	.562	.565	.561	.562	.560	.562	.563
21	.564	.566	.563	.563	.561	.562	.564
22	.570	.570	.566	.564	.566	.565	.566
23	.578	.579	.577	.579	.576	.577	.579
24	.605	.608	.604	.604	.605	.604	.606
25	.638	.638	.638	.638	.638	.637	.640

Figure D2. (cont) Run 6, 6-25-93, ZOC #1 (Lower Blade Pressure Distribution)
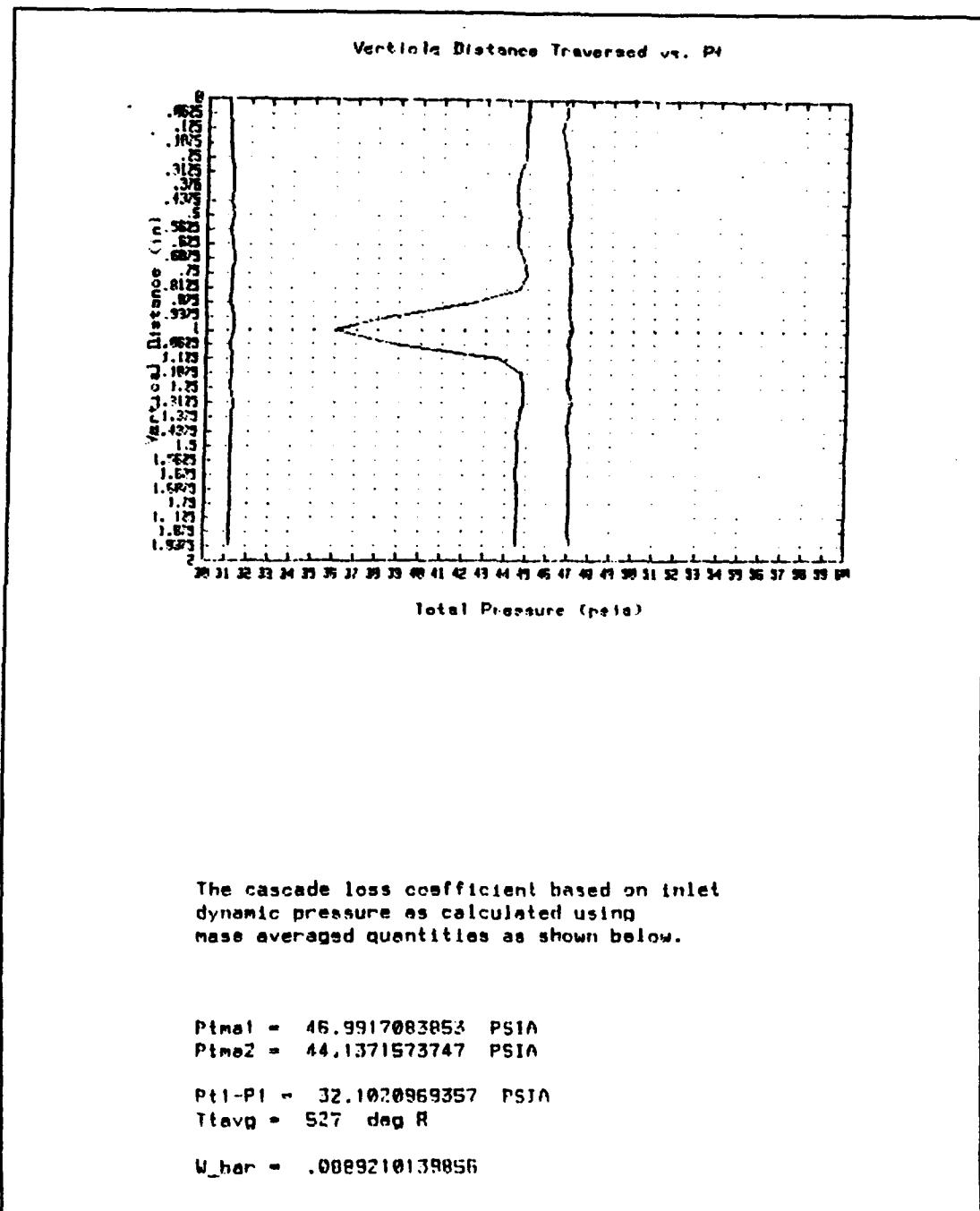
Figure D2. (cont) Run 6, 6-25-93, ZOC #1 (Impact Probe Survey)

```
Data Print Out for Zoc # 1 , Run # 7 , File ZR1306257
    Period between samples (sec):  .001
    Sample collection rate (Hz):   1000
    Number of samples per port:    10
    Length of data run (sec):      10.23
    The scan type is:              3
    Number of scans/traverses:     33
    Increment of traverse:         .0625  Inches
    Atmospheric pressure is:       14.71  psia
    Tunnel Pressure Ratio is:      2.1053521385
```

Scan	Port Number						
	1	2	3	4	5	6	7
1	14.875	14.784	14.834	15.097	17.209	20.008	21.585
2	14.838	14.664	14.807	15.170	16.843	19.158	20.589
3	14.970	14.673	14.843	15.189	16.852	19.075	20.893
4	14.875	14.673	14.825	15.060	16.578	18.789	20.423
5	14.838	14.692	14.834	15.125	16.679	19.408	21.179
6	14.947	14.692	14.898	15.079	16.350	18.531	20.561
7	14.920	14.683	14.843	15.033	16.021	18.457	20.817
8	14.929	14.701	14.907	15.079	16.423	18.826	20.691
9	14.856	14.646	14.852	15.170	16.460	18.604	20.395
10	14.838	14.646	14.834	15.033	16.323	18.928	20.912
11	14.911	14.701	14.852	14.997	16.085	18.955	20.921
12	14.902	14.636	14.871	15.033	16.048	18.004	19.630
13	14.884	14.609	14.788	15.097	16.332	18.549	20.211
14	14.829	14.701	14.816	15.180	16.304	18.946	20.995
15	14.829	14.692	14.862	15.216	16.670	18.863	20.663
16	14.865	14.636	14.816	14.941	16.277	19.149	20.866
17	14.856	14.609	14.852	15.024	15.975	19.001	21.345
18	14.911	14.655	14.779	14.932	15.838	18.272	20.543
19	14.893	14.738	14.798	14.923	16.231	18.364	20.340
20	14.829	14.673	14.798	15.042	16.048	18.420	20.377
21	14.884	14.599	14.825	15.015	16.039	18.651	20.257
22	14.956	14.710	14.898	15.051	16.304	18.946	20.543
23	14.829	14.562	14.843	15.079	16.651	19.066	20.774
24	14.884	14.636	14.816	15.005	16.396	19.371	21.124
25	14.856	14.636	14.825	15.170	16.478	18.771	20.829
26	14.865	14.683	14.843	15.079	16.414	18.872	20.469
27	14.929	14.673	14.798	14.905	15.729	18.466	20.368
28	14.902	14.636	14.770	15.143	16.505	18.918	20.617
29	14.884	14.636	14.816	15.317	16.953	19.805	21.391
30	14.884	14.692	14.871	15.033	16.368	18.641	20.691
31	14.902	14.683	14.816	15.262	16.414	18.715	20.460
32	14.865	14.720	14.843	15.024	16.432	19.029	20.801
33	14.884	14.701	14.880	15.115	15.441	18.891	20.691

Figure D3.   Run 7, 6-25-93, ZOC #1 (Raw Data)

59

Scan	8	Port Number 9	10	11	12	13	14
1	22.531	23.167	23.767	24.419	24.663	25.463	25.595
2	21.590	22.220	22.946	23.755	24.249	24.892	25.296
3	22.106	22.795	23.423	24.109	24.531	25.008	25.390
4	21.781	22.733	23.573	24.224	24.804	25.276	25.552
5	22.323	22.972	23.741	24.384	24.830	25.347	25.629
6	21.763	22.821	23.661	24.331	24.936	25.347	25.527
7	22.160	23.158	23.785	24.472	24.839	25.267	25.416
8	21.817	22.627	23.352	23.941	24.443	24.785	24.996
9	21.573	22.290	22.982	23.480	24.275	24.758	25.296
10	22.097	22.786	23.476	24.136	24.777	25.267	25.646
11	22.115	22.910	23.476	24.047	24.513	24.910	25.262
12	21.156	22.096	22.990	23.843	24.425	24.892	25.270
13	21.355	22.459	23.096	23.896	24.416	24.892	25.279
14	22.233	23.015	23.750	24.277	24.751	25.124	25.441
15	21.898	22.574	23.264	24.100	24.513	25.062	25.441
16	22.052	22.936	23.661	24.260	24.810	25.151	25.364
17	22.495	23.229	23.741	24.260	24.830	25.124	25.493
18	21.745	22.733	23.229	23.879	24.478	24.955	25.253
19	21.699	22.591	23.449	23.959	24.575	25.097	25.356
20	21.808	22.636	23.370	24.074	24.478	24.857	25.048
21	21.518	22.237	23.140	23.896	24.496	24.982	25.398
22	21.708	22.786	23.573	24.357	24.874	25.392	25.741
23	22.170	22.706	23.423	24.224	24.777	25.222	25.544
24	22.387	23.149	23.847	24.463	24.848	25.249	25.484
25	22.206	23.229	23.873	24.455	24.948	25.196	25.535
26	21.835	22.848	23.502	24.171	24.619	25.142	25.373
27	21.735	22.653	23.564	24.029	24.592	25.017	25.416
28	22.133	22.768	23.555	24.198	24.699	25.249	25.655
29	22.468	23.149	23.847	24.357	24.839	25.142	25.484
30	21.925	22.680	23.520	24.215	24.725	25.133	25.475
31	21.934	22.910	23.564	24.348	24.769	25.231	25.450
32	21.998	22.742	23.467	24.145	24.672	25.097	25.561
33	21.943	22.627	23.220	23.985	24.460	25.026	25.441

Figure D3. (cont) Run 7, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number						
	15	16	17	18	19	20	21
1	25.952	26.065	26.229	26.341	26.529	26.645	26.685
2	25.750	25.943	26.221	26.212	26.579	26.715	26.711
3	25.697	25.925	26.136	26.160	26.420	26.690	26.745
4	25.750	25.995	26.178	26.221	26.654	26.593	26.872
5	25.934	26.056	26.281	26.272	26.637	26.504	26.702
6	25.759	25.908	26.136	26.195	26.554	26.566	26.593
7	25.645	25.846	25.957	26.065	26.320	26.436	26.617
8	25.345	25.627	25.863	25.988	26.412	26.436	26.617
9	25.724	25.995	26.136	26.229	26.528	26.558	26.651
10	25.943	26.179	26.255	26.272	26.420	26.549	26.694
11	25.609	25.794	26.017	26.221	26.445	26.488	26.626
12	25.627	26.056	26.110	26.239	26.445	26.514	26.626
13	25.495	25.855	26.000	26.083	26.361	26.595	26.583
14	25.671	25.785	25.914	26.022	26.495	26.444	26.608
15	25.820	25.960	26.085	26.229	26.478	26.575	26.643
16	25.636	25.776	25.838	26.186	26.211	26.505	26.583
17	25.645	25.916	25.914	26.074	26.336	26.549	26.626
18	25.513	25.732	26.009	26.083	26.329	26.479	26.566
19	25.636	25.759	25.991	25.988	26.329	26.462	26.515
20	25.407	25.724	25.991	26.022	26.445	26.514	26.651
21	25.636	25.934	25.931	26.186	26.487	26.619	26.728
22	25.917	26.065	26.264	26.255	26.478	26.514	26.745
23	25.794	25.951	26.093	26.117	26.412	26.427	26.634
24	25.724	25.890	26.008	26.134	26.420	26.601	26.660
25	25.776	26.065	26.221	26.201	26.537	26.540	26.600
26	25.697	25.846	26.034	26.152	26.545	26.558	26.745
27	25.565	25.811	25.948	26.048	26.311	26.471	26.694
28	25.917	26.039	26.136	26.229	26.437	26.488	26.549
29	25.697	25.864	25.965	26.108	26.386	26.471	26.728
30	25.609	25.767	26.000	26.057	26.412	26.540	26.694
31	25.732	25.908	26.025	26.203	26.462	26.627	26.626
32	25.794	26.048	26.136	26.272	26.587	26.601	26.847
33	25.697	25.890	26.110	26.212	26.412	26.523	26.779

Figure D3. (cont) Run 7, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number						
	22	23	24	25	26	27	28
1	27.084	27.499	28.963	30.266	22.076	23.990	22.069
2	27.075	27.551	29.049	30.394	22.059	23.890	21.718
3	27.031	27.472	28.972	30.224	21.704	23.656	21.434
4	27.004	27.586	29.023	30.342	22.363	24.241	22.495
5	26.996	27.499	29.006	30.249	22.017	24.007	21.960
6	27.014	27.429	28.946	30.258	22.042	23.907	22.027
7	26.891	27.332	28.998	30.131	21.704	23.831	21.751
8	27.049	27.516	29.049	30.376	21.856	23.856	21.835
9	26.988	27.376	28.869	30.148	21.915	23.948	21.726
10	26.874	27.455	28.981	30.249	22.025	23.932	21.969
11	26.865	27.429	28.878	30.173	21.746	23.857	21.659
12	26.883	27.490	28.981	30.291	21.594	23.606	21.392
13	26.918	27.359	28.912	30.207	21.746	23.923	21.885
14	26.953	27.350	28.869	30.139	21.662	23.731	21.509
15	26.970	27.429	28.912	30.241	22.135	24.049	22.044
16	26.944	27.297	28.766	30.089	21.814	23.689	21.601
17	26.891	27.297	28.938	30.114	21.670	23.731	21.551
18	26.856	27.315	28.843	30.215	21.730	23.740	21.668
19	26.988	27.332	29.929	30.182	21.670	23.739	21.543
20	26.795	27.402	28.818	30.232	21.949	23.831	21.685
21	27.049	27.516	29.093	30.317	22.050	23.973	21.902
22	26.918	27.490	28.921	30.241	21.882	23.765	21.618
23	26.935	27.437	29.929	30.131	21.755	23.723	21.718
24	26.996	27.472	28.843	30.224	21.865	23.957	21.977
25	26.777	27.297	28.861	30.215	21.696	23.773	21.793
26	26.926	27.315	28.921	30.342	22.034	24.082	21.910
27	26.865	27.455	28.972	30.215	21.738	23.756	21.576
28	26.953	27.420	28.989	30.291	22.194	23.990	22.019
29	27.014	27.420	28.878	30.300	22.076	24.007	22.102
30	26.988	27.499	28.963	30.249	21.915	23.974	21.969
31	26.979	27.516	29.015	30.291	21.974	23.949	21.952
32	27.136	27.569	28.998	30.232	22.262	24.040	22.094
33	26.961	27.420	29.032	30.274	21.665	23.882	21.785

Figure D3. (cont) Run 7, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	14.999	31.579	47.302	45.691
2	15.049	31.545	47.566	45.677
3	14.991	31.493	47.464	45.606
4	14.974	31.545	47.481	45.650
5	15.049	31.519	47.523	45.421
6	14.966	31.476	47.395	45.087
7	14.958	31.442	47.447	44.998
8	15.041	31.519	47.617	45.227
9	14.983	31.442	47.319	45.131
10	14.933	31.442	47.327	45.095
11	14.983	31.502	47.489	45.316
12	14.991	31.536	47.557	45.465
13	14.983	31.383	47.319	45.412
14	14.966	31.459	47.387	45.042
15	14.941	31.408	47.404	42.813
16	14.958	31.400	47.259	38.387
17	14.966	31.442	47.361	36.269
18	15.009	31.434	47.387	39.251
19	14.966	31.468	47.387	44.232
20	14.916	31.348	47.447	45.324
21	14.958	31.442	47.489	45.388
22	15.032	31.528	47.532	45.412
23	14.974	31.442	47.370	45.183
24	14.949	31.425	47.557	45.183
25	14.999	31.417	47.421	45.042
26	14.966	31.417	47.361	45.016
27	14.974	31.459	47.455	45.026
28	14.924	31.340	47.481	44.998
29	14.924	31.383	47.395	44.972
30	15.016	31.442	47.361	44.981
31	14.974	31.502	47.515	45.034
32	15.016	31.357	47.413	44.981
33	15.049	31.502	47.549	45.069

Figure D3. (cont) Run 7, 6-25-93, ZOC #1 (Raw Data)

63

Normalized Pressure vs. Percent Chord

Port	Scan Number						
	10	11	12	13	14	15	16
1	.314	.314	.313	.315	.313	.313	.315
2	.309	.310	.309	.309	.310	.310	.310
3	.313	.313	.313	.313	.313	.314	.314
4	.318	.316	.316	.319	.320	.321	.316
5	.345	.339	.337	.345	.344	.352	.344
6	.400	.399	.379	.392	.400	.398	.405
7	.442	.441	.413	.427	.443	.436	.442
8	.467	.466	.445	.451	.469	.462	.467
9	.481	.482	.465	.475	.486	.476	.485
10	.496	.494	.483	.488	.501	.491	.501
11	.510	.506	.501	.505	.512	.508	.513
12	.524	.516	.514	.516	.522	.517	.521
13	.534	.525	.523	.526	.530	.529	.532
14	.542	.532	.531	.534	.537	.537	.537
15	.548	.539	.539	.539	.542	.545	.542
16	.553	.543	.548	.546	.544	.549	.545
17	.555	.548	.549	.549	.547	.550	.547
18	.555	.552	.652	.551	.549	.553	.554
19	.558	.557	.556	.557	.559	.559	.555
20	.561	.558	.558	.560	.558	.561	.561
21	.564	.661	.560	.562	.562	.562	.562
22	.568	.566	.565	.569	.589	.569	.570
23	.580	.578	.578	.578	.577	.579	.578
24	.612	.608	.609	.611	.609	.610	.609
25	.635	.635	.637	.638	.636	.638	.637

Figure D3. (cont) Run 7, 6-25-93, ZOC #1 (Lower Blade Pressure Distribution)
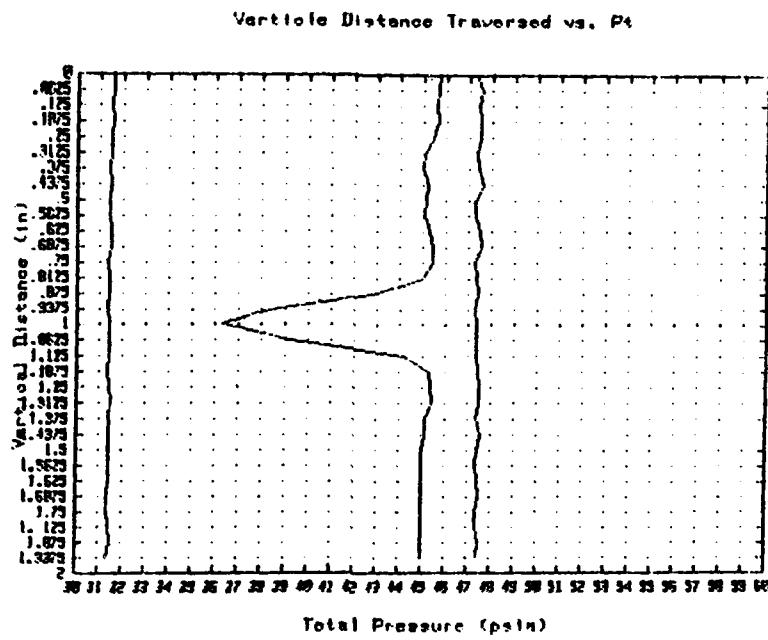
64

The cascade loss coefficient based on inlet
dynamic pressure as calculated using
mass averaged quantities as shown below.

Ptma1 = 47.434658903 PSIA
Ptma2 = 44.6821459885 PSIA

Pt1-P1 = 32.4533898039 PSIA
Ttavg = 529.5 deg R

W_bar = .0848143423888

Figure D3.   (cont) Run 7, 6-25-93, ZOC #1 (Impact Probe
Survey)

65

Data Print Out for Zoc # 1 , Run # 8 , FileZR1306258
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port: 10
    Length of data run (sec):   31
    The scan type is: 3
    Number of scans/traverses: 33
    Increment of traverse: .0625 Inches
    Atmospheric pressure is: 14.71 psia
    Tunnel Pressure Ratio is: 2.0987295613

Scan	Port Number						
	1	2	3	4	5	6	7
1	14.846	14.631	16.040	15.256	16.639	19.896	21.207
2	14.828	14.649	15.989	15.201	17.284	19.868	20.885
3	14.819	14.603	15.819	15.017	18.921	19.516	20.766
4	14.792	14.547	16.881	14.981	18.230	19.526	20.885
5	14.755	14.593	15.961	15.192	17.030	19.720	20.996
6	14.783	14.528	15.872	15.063	18.493	19.184	20.702
7	14.755	14.584	15.925	14.990	16.121	18.481	19.921
8	14.819	14.584	15.951	14.999	16.521	19.221	20.913
9	14.774	14.603	15.881	14.944	16.366	19.203	21.032
10	14.837	14.649	15.907	14.935	15.866	18.639	20.380
11	14.810	14.584	15.943	14.972	16.366	19.322	21.051
12	14.828	14.640	15.960	15.256	16.712	19.600	20.573
13	14.837	14.593	15.899	14.982	16.203	18.620	20.150
14	14.801	14.556	15.951	15.219	16.902	19.443	20.784
15	14.855	14.566	15.934	15.100	16.748	19.525	20.619
16	14.819	14.575	15.925	15.027	16.330	18.805	20.720
17	14.755	14.547	15.854	16.054	16.293	18.833	20.490
18	14.755	14.584	15.898	14.916	16.157	18.990	20.996
19	14.692	14.547	15.872	14.981	16.248	18.999	20.674
20	14.774	14.612	15.907	14.944	16.257	19.212	20.821
21	14.774	14.556	15.916	15.054	16.530	19.424	20.619
22	14.765	14.621	15.934	15.256	16.584	19.304	20.858
23	14.755	14.621	15.890	14.990	16.148	18.537	20.582
24	14.755	14.510	15.838	14.990	16.666	18.898	20.316
25	14.746	14.584	15.828	15.118	16.684	19.101	20.646
26	14.810	14.575	15.890	15.054	18.811	19.941	21.317
27	14.755	14.556	15.916	15.017	16.448	18.879	20.555
28	14.755	14.584	16.881	14.916	16.457	19.386	20.509
29	14.792	14.603	15.883	15.054	16.984	19.664	21.170
30	14.792	14.538	15.834	15.302	17.239	18.886	20.821
31	14.755	14.603	15.943	15.027	16.521	19.156	20.729
32	14.918	14.677	15.898	15.155	16.984	19.692	20.637
33	14.837	14.658	15.996	15.339	17.202	19.498	20.591

Figure D4.   Run 8, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number 8	9	10	11	12	13	14
1	21.981	22.775	23.488	24.237	24.776	25.121	25.415
2	21.837	22.837	23.639	24.362	24.741	25.239	25.389
3	21.828	22.757	23.568	24.370	24.635	25.005	25.116
4	21.828	22.616	23.320	24.353	24.873	25.175	25.381
5	22.071	22.748	23.205	23.829	24.371	24.979	25.424
6	21.882	22.757	23.365	23.802	24.169	25.068	25.441
7	21.423	22.572	23.329	24.282	24.829	25.247	25.321
8	21.720	22.510	23.267	24.095	24.582	25.095	25.295
9	22.350	23.111	23.418	23.651	24.142	24.925	25.406
10	21.747	22.562	23.152	23.811	24.415	24.952	25.073
11	22.188	22.678	23.312	23.740	24.318	24.844	25.022
12	21.495	22.509	22.931	23.740	24.318	25.059	25.415
13	21.585	22.686	23.329	23.829	24.468	25.193	25.201
14	21.954	22.722	23.418	24.006	24.309	25.014	25.313
15	21.396	22.005	22.825	23.846	24.635	25.229	25.227
16	22.269	23.270	23.373	23.642	24.239	24.961	25.441
17	21.954	22.846	23.329	23.998	24.547	25.023	25.150
18	22.188	22.890	23.382	24.104	24.626	25.068	25.022
19	21.927	22.775	23.701	24.299	24.600	25.032	25.330
20	21.999	22.748	23.294	23.988	24.503	25.104	25.287
21	21.927	22.651	23.471	24.024	24.662	25.139	25.295
22	21.909	22.695	23.267	24.051	24.538	25.291	25.278
23	21.783	22.740	23.179	23.802	24.424	24.979	25.381
24	21.414	22.368	23.444	24.459	24.697	25.273	25.330
25	21.828	22.448	23.285	23.900	24.283	24.934	25.475
26	22.170	22.740	23.329	23.989	24.380	24.791	25.415
27	21.648	22.757	23.639	23.926	24.450	24.925	25.338
28	21.540	22.837	23.692	24.255	24.600	25.175	25.295
29	22.467	23.208	23.630	24.122	24.494	25.041	25.398
30	21.738	22.563	23.453	24.095	24.626	25.247	25.253
31	22.161	23.482	23.736	24.299	24.609	25.050	25.210
32	21.504	22.527	23.409	24.398	24.785	25.443	25.407
33	21.639	22.324	23.409	24.433	24.891	25.193	25.167

Figure D4. (cont) Run 8, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number						
	15	16	17	18	19	20	21
1	25.766	25.845	25.909	26.049	26.247	26.473	26.613
2	25.669	26.029	26.148	26.083	26.263	26.351	26.485
3	25.634	25.635	25.875	26.006	26.172	26.396	26.400
4	25.757	25.967	26.080	26.126	26.355	26.509	26.570
5	25.678	25.678	25.866	26.109	26.205	26.491	26.638
6	25.669	25.862	25.977	26.066	26.263	26.394	26.434
7	25.431	25.617	25.935	26.049	26.097	26.482	26.434
8	25.431	25.512	25.841	26.006	26.188	26.368	26.442
9	25.757	25.853	25.918	26.006	26.155	26.394	26.494
10	25.334	25.652	25.977	26.003	26.197	26.368	26.519
11	25.361	25.468	25.730	25.963	26.072	26.351	26.613
12	25.563	25.705	25.875	25.945	26.180	26.473	26.502
13	25.475	25.661	26.045	26.066	26.263	26.499	26.477
14	25.590	25.818	25.943	26.118	26.222	26.316	26.596
15	25.396	25.599	26.063	26.135	26.247	26.403	26.562
16	25.748	25.985	26.028	26.040	26.380	26.473	26.528
17	25.326	25.600	25.909	26.006	26.205	26.368	26.451
18	25.343	25.757	25.866	25.902	26.155	26.351	26.494
19	25.537	25.731	25.875	25.937	26.147	26.184	26.400
20	25.616	25.775	25.849	25.790	26.105	26.316	26.570
21	25.625	25.827	25.977	25.988	26.222	26.289	26.400
22	25.546	25.827	25.952	25.937	26.272	26.333	26.434
23	25.669	25.783	25.952	26.144	26.288	26.412	26.442
24	25.660	25.915	26.037	26.135	26.313	26.412	26.477
25	26.678	25.748	25.969	25.902	26.138	26.403	26.494
26	25.722	25.722	25.875	25.954	26.122	26.307	26.425
27	25.669	25.818	26.020	26.075	26.180	26.535	26.587
28	25.625	25.766	25.918	25.842	26.288	26.491	26.545
29	25.511	25.853	25.994	26.135	26.163	26.386	26.357
30	25.775	26.037	26.182	26.118	26.180	26.438	26.383
31	25.713	25.810	25.866	26.092	26.447	26.613	26.689
32	25.651	25.871	25.994	26.049	26.272	26.438	26.613
33	25.704	25.853	26.011	26.083	26.213	26.561	26.570

Figure D4. (cont) Run 8, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number 22	23	24	25	26	27	28
1	26.824	27.302	28.623	30.206	21.709	23.687	21.578
2	26.579	27.267	28.726	30.080	22.040	23.879	22.081
3	26.596	27.250	28.658	30.071	21.752	23.704	21.796
4	26.710	27.267	28.726	30.147	22.169	23.813	21.914
5	26.623	27.066	28.478	29.870	21.845	23.896	21.922
6	26.763	27.276	28.623	30.029	21.845	23.562	21.620
7	26.666	27.302	28.580	30.071	21.972	23.829	21.662
8	26.684	27.267	28.598	30.038	21.904	23.846	21.905
9	26.728	27.250	28.503	29.937	21.904	23.796	22.157
10	26.666	27.171	28.649	30.029	21.752	23.671	21.846
11	26.885	27.390	28.598	30.097	22.312	23.988	22.174
12	26.562	27.127	28.418	30.055	21.565	23.788	21.956
13	26.728	27.390	28.698	30.029	21.921	23.948	22.224
14	26.623	27.162	28.409	29.896	21.531	23.679	21.821
15	26.684	27.276	28.701	30.114	21.896	23.829	21.897
16	26.675	27.241	28.572	30.055	21.786	23.854	21.830
17	26.430	27.189	28.538	30.029	21.804	23.879	22.023
18	26.719	27.224	28.478	29.920	21.438	23.462	21.494
19	26.527	27.101	28.480	30.004	21.691	23.704	21.720
20	26.771	27.241	28.492	30.004	21.760	23.679	21.653
21	26.597	27.197	28.503	29.996	21.930	23.729	21.787
22	26.562	27.101	28.546	30.071	21.811	23.896	22.107
23	26.588	27.259	28.503	30.029	21.921	23.779	21.712
24	26.492	27.075	28.469	29.962	21.624	23.637	21.494
25	26.701	27.206	28.555	29.979	21.650	23.579	21.569
26	26.710	27.197	28.623	30.038	22.244	23.930	22.056
27	26.701	27.276	28.503	30.004	21.955	23.671	21.754
28	26.736	27.136	28.555	30.029	22.015	23.913	21.939
29	26.649	27.154	28.555	29.996	21.820	23.836	22.056
30	26.675	27.276	28.623	30.013	21.947	23.854	21.804
31	26.824	27.390	28.598	30.071	22.100	23.896	21.998
32	26.808	27.267	28.615	30.029	21.930	23.846	21.939
33	26.833	27.320	28.641	30.123	21.998	23.712	21.922

Figure D4. (cont) Run 8, 6-25-93, ZOC #1 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	14.985	31.449	47.406	45.263
2	14.968	31.347	47.278	45.263
3	14.935	31.372	47.321	45.057
4	14.876	31.261	47.193	44.920
5	14.926	31.287	47.176	44.629
6	14.968	31.312	47.176	44.629
7	14.918	31.261	47.210	44.629
8	14.935	31.244	47.330	44.672
9	14.918	31.278	47.202	44.680
10	14.943	31.338	47.295	44.782
11	14.943	31.304	47.168	44.715
12	14.951	31.321	47.338	44.937
13	14.926	31.287	47.321	44.723
14	14.960	31.252	47.304	42.663
15	14.993	31.347	47.389	38.412
16	14.977	31.304	47.321	36.082
17	14.977	31.355	47.219	38.810
18	14.943	31.235	47.270	43.891
19	14.926	31.244	47.099	44.689
20	14.885	31.175	47.091	44.715
21	14.926	31.287	47.142	44.792
22	14.868	31.218	47.193	44.586
23	14.910	31.295	47.116	44.518
24	14.943	31.244	47.219	44.569
25	14.926	31.261	47.236	44.603
26	14.926	31.244	47.091	44.466
27	14.910	31.150	47.236	44.458
28	14.960	31.235	47.253	44.406
29	14.893	31.244	47.133	44.423
30	14.918	31.141	47.082	44.483
31	14.918	31.218	47.270	44.528
32	14.943	31.312	47.312	44.686
33	14.893	31.270	47.321	44.612

Figure D4. (cont) Run 8, 6-25-93, ZOC #1 (Raw Data)

Normalized Pressure vs. Percent Chord

Port	Scan Number						
	10	11	12	13	14	15	16
1	.314	.314	.313	.314	.313	.313	.313
2	.310	.309	.309	.308	.308	.307	.309
3	.336	.338	.337	.336	.337	.336	.317
4	.316	.317	.322	.316	.322	.319	.318
5	.331	.347	.353	.342	.357	.353	.345
6	.394	.410	.414	.393	.411	.412	.397
7	.431	.446	.435	.426	.439	.435	.438
8	.460	.470	.454	.456	.464	.451	.471
9	.477	.481	.476	.479	.480	.464	.492
10	.490	.494	.484	.493	.495	.482	.494
11	.503	.503	.501	.504	.507	.503	.500
12	.516	.516	.514	.517	.514	.520	.512
13	.528	.527	.529	.532	.529	.532	.527
14	.530	.530	.537	.533	.535	.532	.538
15	.536	.538	.540	.539	.541	.536	.544
16	.542	.540	.543	.542	.546	.540	.549
17	.549	.546	.547	.550	.548	.550	.550
18	.551	.550	.548	.551	.552	.551	.550
19	.554	.553	.553	.555	.554	.554	.557
20	.558	.559	.559	.560	.556	.557	.559
21	.561	.564	.560	.560	.562	.560	.561
22	.564	.570	.561	.565	.563	.563	.564
23	.574	.581	.573	.579	.574	.576	.576
24	.606	.606	.600	.604	.601	.606	.604
25	.635	.638	.635	.635	.634	.635	.635

Figure D4. (cont) Run 8, 6-25-93, ZOC #1 (Lower Blade Pressure Distribution)

71

Vertical Distance Traversed vs. Pt
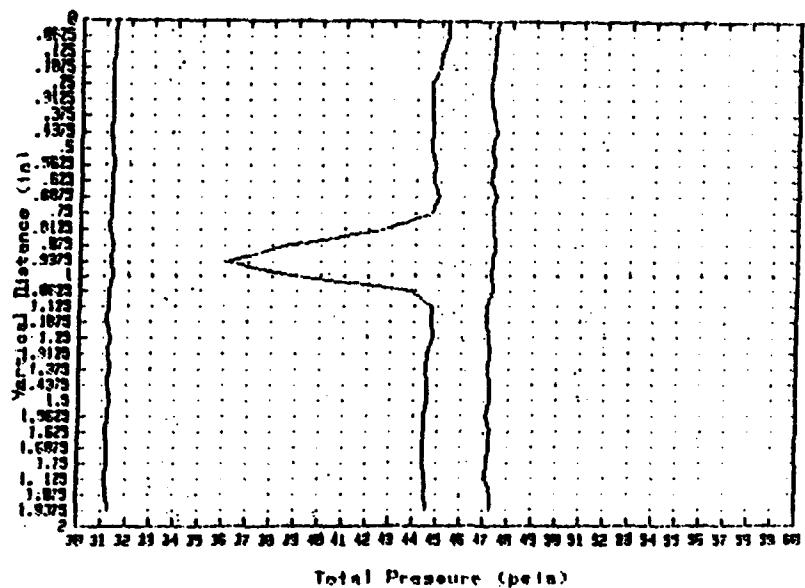
The cascade loss coefficient based on inlet
dynamic pressure as calculated using
mass averaged quantities as shown below.

.Ptma1 = 47.2338398505 PSIA
Ptma2 = 44.1771154835 PSIA

Pt1-P1 = 32.3006671173 PSIA
Ttavg = 525 deg.R

W_bar = .0946334747797

Figure D4.   (cont) Run 8, 6-25-93, ZOC #1 (Impact Probe
Survey)

72

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Data Print Out for Zoc # 2 , Run # 3 , File7R2311021
     Period between samples (sec): .001
     Sample collection rate (Hz): 1000
     Number of samples per port:  10
     Length of data run (sec):    10.23
     The scan type is:            3
     Number of scans/traverses:   33
     Increment of traverse:       .0625  Inches
     Atmospheric pressure is:     14.78  psia
     Tunnel Pressure Ratio is:    1.00014053088
```

Scan	Port Number 1	2	3	4	5	6	7
1	27.539	27.895	27.616	27.365	27.340	27.389	27.450
2	27.649	27.848	27.616	27.323	27.435	27.565	27.498
3	27.758	27.941	27.681	27.323	27.388	27.477	27.546
4	27.649	27.895	27.681	27.450	27.388	27.389	27.498
5	27.593	27.801	27.681	27.407	27.481	27.521	27.546
6	27.431	27.662	27.616	27.323	27.294	27.389	27.546
7	27.706	27.942	27.745	27.448	27.388	27.433	27.642
8	27.539	27.895	27.616	27.491	27.528	27.345	27.546
9	27.487	27.848	27.745	27.365	27.294	27.346	27.642
10	27.485	27.895	27.616	27.491	27.528	27.389	27.642
11	27.649	27.895	27.616	27.450	27.435	27.346	27.498
12	27.540	27.616	27.616	27.196	27.294	27.345	27.450
13	27.378	27.988	27.616	27.407	27.481	27.477	27.642
14	27.595	27.942	27.681	27.322	27.341	27.345	27.690
15	27.757	27.941	27.681	27.533	27.435	27.434	27.402
16	27.327	27.663	27.616	27.322	27.387	27.345	27.306
17	27.377	27.709	27.616	27.365	27.435	27.301	27.498
18	27.376	27.756	27.616	27.492	27.388	27.433	27.546
19	27.595	27.848	27.616	27.407	27.481	27.477	27.594
20	27.485	27.988	27.616	27.323	27.388	27.345	27.642
21	27.486	27.709	27.616	27.407	27.388	27.301	27.498
22	27.430	27.802	27.616	27.533	27.388	27.345	27.594
23	27.540	27.988	27.616	27.449	27.387	27.389	27.738
24	27.431	27.802	27.616	27.366	27.294	27.301	27.450
25	27.594	27.802	27.616	27.450	27.387	27.177	27.498
26	27.539	27.755	27.616	27.322	27.341	27.389	27.450
27	27.214	27.616	27.616	27.238	27.246	27.301	27.306
28	27.486	27.708	27.616	27.407	27.246	27.389	27.690
29	27.595	27.849	27.616	27.449	27.434	27.389	27.306
30	27.430	27.895	27.616	27.365	27.387	27.389	27.594
31	27.649	27.942	27.616	27.366	27.341	27.346	27.354
32	27.322	27.709	27.616	27.238	27.341	27.257	27.258
33	27.594	27.802	27.616	27.110	27.294	27.169	27.354

Figure D5.   Run 3, 11-2-93, ZOC #2 (Raw Data)

Scan	Port Number						
	8	9	10	11	12	13	14
1	27.301	27.941	27.216	27.859	26.843	27.782	27.840
2	27.522	27.892	27.391	27.938	26.782	27.838	27.942
3	27.301	27.843	27.391	27.859	26.782	27.950	27.891
4	27.390	27.892	27.391	27.978	26.721	27.782	27.891
5	27.389	27.843	27.390	27.938	26.721	27.725	27.891
6	27.478	27.794	27.521	27.899	26.782	27.725	27.891
7	27.478	27.843	27.347	27.938	26.721	27.725	27.789
8	27.390	27.892	27.478	27.899	26.721	27.725	27.891
9	27.390	27.745	27.391	28.017	26.721	27.725	27.891
10	27.521	27.892	27.435	28.057	26.721	27.725	27.891
11	27.522	27.843	27.260	27.978	26.721	27.725	27.891
12	27.346	27.892	27.390	27.740	26.721	27.725	27.789
13	27.433	27.843	27.435	28.018	26.721	27.725	27.840
14	27.433	27.991	27.478	27.899	26.721	27.725	27.891
15	27.522	27.843	27.303	28.018	26.782	27.725	27.891
16	27.390	27.941	27.433	27.899	26.721	27.725	27.891
17	27.345	27.843	27.435	28.018	26.721	27.782	27.891
18	27.390	27.794	27.478	27.899	26.721	27.725	27.891
19	27.522	27.745	27.347	27.939	26.721	27.725	27.840
20	27.390	27.843	27.478	27.899	26.721	27.725	27.891
21	27.345	27.745	27.478	27.859	26.721	27.725	27.891
22	27.390	27.843	27.348	27.978	26.721	27.725	27.891
23	27.301	27.941	27.347	27.899	26.721	27.725	27.891
24	27.434	27.892	27.609	27.978	26.721	27.725	27.891
25	27.390	27.794	27.521	27.938	26.721	27.725	27.891
26	27.398	27.843	27.434	28.017	26.721	27.725	27.891
27	27.346	27.646	27.303	27.820	26.721	27.725	27.891
28	27.433	27.745	27.347	27.978	26.721	27.725	27.789
29	27.389	27.794	27.347	27.898	26.721	27.725	27.891
30	27.434	27.745	27.304	28.017	26.721	27.725	27.891
31	27.346	27.794	27.303	27.899	26.721	27.725	27.891
32	27.256	27.745	27.260	27.701	26.721	27.725	27.789
33	27.301	27.696	27.216	27.740	26.721	27.725	27.789

Figure D5. (cont) Run 3, 11-2-93, ZOC #2 (Raw Data)

74

Scan	Port Number						
	15	16	17	18	19	20	21
1	27.074	27.001	27.521	26.588	14.507	14.290	22.899
2	27.255	27.298	27.769	26.667	14.265	14.175	22.769
3	27.029	27.044	27.571	26.508	14.314	14.290	22.725
4	27.255	27.086	27.670	26.588	14.459	14.251	22.812
5	27.299	27.214	27.670	26.708	14.314	14.173	22.812
6	27.075	27.001	27.719	26.708	14.507	14.368	22.639
7	27.120	27.171	27.620	26.588	14.410	14.329	22.639
8	27.300	27.213	27.719	26.628	14.459	14.251	22.812
9	27.120	27.096	27.570	26.548	14.459	14.173	22.682
10	27.345	27.256	27.870	26.588	14.410	14.290	22.682
11	27.165	27.128	27.620	26.688	14.507	14.212	22.769
12	27.210	26.918	27.422	26.427	14.410	14.173	22.639
13	27.300	27.214	27.869	26.546	14.410	14.290	22.596
14	27.165	27.256	27.769	26.667	14.410	14.212	22.812
15	27.255	27.129	27.620	26.508	14.410	14.290	22.552
16	27.120	27.129	27.620	26.707	14.556	14.368	22.682
17	27.255	27.256	27.869	26.669	14.556	14.173	22.596
18	27.165	27.044	27.719	26.668	14.459	14.290	22.509
19	27.075	26.958	27.670	26.468	14.556	14.211	22.552
20	27.165	27.044	27.719	26.509	14.459	14.212	22.552
21	27.210	27.044	27.471	26.548	14.556	14.407	22.682
22	27.254	27.128	27.670	26.588	14.313	14.329	22.682
23	27.165	27.086	27.521	26.467	14.362	14.173	22.639
24	27.210	27.086	27.669	26.469	14.362	14.329	22.682
25	27.209	27.002	27.869	26.627	14.459	14.290	22.639
26	27.120	27.129	27.669	26.508	14.459	14.134	22.596
27	27.076	27.044	27.669	26.548	14.556	13.978	22.769
28	27.299	27.213	27.620	26.708	14.411	14.213	22.639
29	27.119	26.959	27.521	26.468	14.314	14.172	22.509
30	27.074	27.086	27.620	26.588	14.265	14.251	22.596
31	27.210	27.129	27.570	26.508	14.362	14.330	22.552
32	27.075	27.001	27.670	26.428	14.362	14.251	22.596
33	27.030	26.916	27.521	26.347	14.507	14.290	22.812

Figure D5. (cont) Run 3, 11-2-93, ZOC #2 (Raw Data)

Scan	Port Number						
	22	23	24	25	26	27	28
1	25.555	27.146	28.176	27.893	28.167	28.188	27.864
2	25.663	27.199	28.073	27.837	28.115	28.139	27.984
3	25.391	27.044	28.176	27.837	28.064	28.139	27.984
4	25.553	27.095	28.176	27.893	28.218	28.189	27.864
5	25.500	27.146	28.073	27.837	28.054	28.188	27.864
6	25.445	27.046	28.073	27.949	28.084	28.108	27.864
7	25.446	27.198	28.073	27.837	28.064	28.188	27.864
8	25.663	27.146	28.073	27.781	28.064	28.188	27.864
9	25.555	27.199	28.073	27.781	28.064	28.188	27.864
10	25.608	27.146	28.073	27.781	28.064	28.188	27.864
11	25.555	27.044	28.073	27.781	28.064	28.188	27.924
12	25.391	27.044	28.022	27.781	28.064	28.168	27.864
13	25.392	27.044	28.073	27.781	28.115	28.189	27.924
14	25.663	27.147	28.073	27.781	28.064	28.188	27.864
15	25.608	27.198	28.073	27.781	28.064	28.189	27.864
16	25.608	27.095	28.073	27.837	28.084	28.189	27.864
17	25.445	26.889	28.073	27.781	28.064	28.198	27.864
18	25.391	27.147	28.073	27.781	28.064	28.188	27.864
19	25.283	26.941	28.073	27.781	28.064	28.188	27.864
20	25.283	27.044	28.073	27.781	28.064	28.188	27.864
21	25.391	26.993	28.073	27.781	28.064	28.188	27.864
22	25.391	26.941	28.022	27.781	28.064	28.188	27.864
23	25.231	27.044	28.073	27.781	28.064	28.188	27.864
24	25.282	26.993	28.073	27.781	28.064	28.188	27.864
25	25.392	27.045	28.073	27.781	28.064	28.188	27.864
26	25.553	27.096	28.073	27.781	28.064	28.189	27.864
27	25.444	27.146	28.073	27.781	28.064	28.188	27.864
28	25.609	27.147	28.073	27.781	28.064	28.188	27.864
29	25.283	26.992	28.073	27.781	28.064	28.188	27.864
30	25.229	26.890	28.073	27.781	28.064	28.188	27.864
31	25.391	26.941	28.073	27.781	28.115	28.189	27.864
32	25.444	26.838	28.073	27.781	28.064	28.188	27.864
33	25.553	27.198	28.073	27.781	28.064	28.091	27.864

Figure D5. (cont) Run 3, 11-2-93, ZOC #2 (Raw Data)

Scan	29	Port Number 30	31	32
1	28.029	28.033	27.916	26.947
2	28.144	28.033	27.916	26.991
3	28.086	27.978	27.916	26.947
4	28.086	27.978	27.856	26.947
5	28.086	27.978	27.916	26.947
6	28.086	27.978	27.856	26.947
7	28.029	28.143	27.856	27.120
8	28.086	27.978	27.856	26.991
9	28.086	27.978	27.856	27.077
10	28.029	27.978	27.856	26.947
11	28.029	27.978	27.856	26.947
12	28.029	27.978	27.916	26.947
13	28.029	27.978	27.916	27.077
14	28.029	27.978	27.856	26.991
15	28.029	27.978	27.856	26.991
16	28.029	27.978	27.856	26.991
17	28.029	27.978	27.856	26.947
18	28.029	27.978	27.856	26.904
19	28.029	27.978	27.856	26.947
20	28.029	27.978	27.856	27.034
21	28.029	27.978	27.856	26.991
22	28.029	27.978	27.856	27.034
23	28.029	27.978	27.856	26.991
24	28.029	27.978	27.856	26.947
25	28.029	27.978	27.856	27.034
26	28.029	27.978	27.856	26.947
27	28.029	27.978	27.856	26.947
28	28.029	27.978	27.856	26.947
29	28.029	27.978	27.856	26.947
30	28.029	27.978	27.856	26.947
31	28.029	27.978	27.856	26.947
32	28.029	27.978	27.856	26.947
33	28.029	27.978	27.856	26.860

Figure D5. (cont) Run 3, 11-2-93, ZOC #2 (Raw Data)

Data Print Out for Zoc # 2 , Run # 5 , File:ZR2311023
    Period between samples (sec): .001
    Sample collection rate (Hz): 1000
    Number of samples per port: 10
    Length of data run (sec): 10.23
    The scan type is: 3
    Number of scans/traverses: 33
    Increment of traverse: .0625 Inches
    Atmospheric pressure is: 14.78 psia
    Tunnel Pressure Ratio is: .994740872276

Scan	Port Number						
	1	2	3	4	5	6	7
1	27.965	28.199	27.674	28.337	28.204	28.173	28.230
2	27.965	28.199	27.674	28.424	28.336	28.258	28.230
3	27.965	28.199	27.674	28.251	28.204	28.087	28.230
4	27.965	28.199	27.674	28.251	28.292	28.087	28.181
5	27.965	28.199	27.674	28.294	28.248	28.044	28.181
6	27.965	28.199	27.674	28.337	28.379	28.173	28.230
7	27.965	28.199	27.674	28.251	28.204	28.087	28.181
8	27.965	28.199	27.674	28.294	28.248	28.215	28.133
9	27.965	28.199	27.674	28.337	28.248	28.130	28.133
10	27.912	28.199	27.674	28.424	28.248	28.258	28.230
11	27.859	28.152	27.674	28.208	28.160	28.129	28.181
12	27.965	28.199	27.674	28.208	28.379	28.215	28.230
13	27.912	28.152	27.674	28.251	28.160	28.216	28.181
14	27.965	28.199	27.674	28.208	28.204	28.087	28.230
15	27.965	28.199	27.674	28.381	28.292	28.172	28.230
16	27.912	28.199	27.674	28.251	28.159	28.043	28.181
17	27.912	28.199	27.612	28.251	28.204	28.001	28.230
18	27.965	28.199	27.674	28.381	28.336	28.173	28.181
19	27.912	28.199	27.674	28.294	28.335	28.258	28.181
20	27.965	28.199	27.674	28.381	28.115	28.215	28.230
21	27.859	28.199	27.674	28.381	28.248	28.130	28.084
22	27.965	28.199	27.674	28.381	28.204	28.258	28.230
23	27.965	28.152	27.674	28.121	28.204	28.130	28.084
24	27.965	28.199	27.674	28.164	28.204	28.087	28.230
25	27.965	28.199	27.674	28.381	28.248	28.342	28.230
26	27.965	28.199	27.674	28.294	28.248	28.172	28.133
27	27.965	28.199	27.674	28.208	28.204	28.130	28.230
28	27.965	28.199	27.674	28.294	28.204	28.173	28.230
29	27.965	28.199	27.674	28.337	28.159	28.128	28.230
30	27.965	28.199	27.674	28.337	28.204	28.301	28.230
31	27.965	28.152	27.674	28.381	28.292	28.216	28.230
32	27.912	28.199	27.674	28.121	28.160	28.044	27.987
33	27.965	28.199	27.674	28.164	28.204	28.130	28.230

Figure D6.   Run 5, 11-2-93, ZOC #2 (Raw Data)

78

Scan		Port Number					
	8	9	10	11	12	13	14
1	28.122	28.238	28.632	28.273	26.723	27.885	28.083
2	28.250	28.238	28.539	28.273	26.723	27.885	28.083
3	28.250	28.238	28.585	28.273	26.723	27.885	28.083
4	28.165	28.238	28.492	28.273	26.723	27.885	28.083
5	28.292	28.238	28.399	28.273	26.723	27.885	28.083
6	28.122	28.238	28.539	28.273	26.723	27.885	28.083
7	28.165	28.238	28.492	28.273	26.723	27.885	28.083
8	28.122	28.238	28.538	28.273	26.723	27.885	28.083
9	28.250	28.238	28.539	28.273	26.723	27.885	28.083
10	28.164	28.238	28.585	28.273	26.723	27.885	28.083
11	28.122	28.238	28.445	29.273	26.723	27.885	28.093
12	28.122	28.238	28.538	28.273	26.723	27.885	28.083
13	28.122	28.238	28.585	28.273	26.723	27.885	28.093
14	28.164	28.238	28.446	28.273	26.723	27.885	28.031
15	28.208	28.238	28.639	28.273	26.723	27.985	28.083
16	28.164	28.238	28.586	28.273	26.723	27.885	28.083
17	28.164	28.238	28.399	28.273	26.723	27.885	28.083
18	28.164	28.238	28.538	28.273	26.723	27.885	28.083
19	28.122	28.238	28.538	28.273	26.723	27.885	28.083
20	28.250	28.238	28.353	28.273	26.723	27.885	28.083
21	28.208	28.239	28.539	28.273	26.723	27.885	28.083
22	28.378	28.238	28.492	28.273	26.723	27.885	28.083
23	28.036	28.238	28.307	28.273	26.723	27.885	28.083
24	28.122	28.238	28.539	28.273	26.723	27.885	28.083
25	28.250	28.238	28.538	28.273	26.723	27.885	28.083
26	28.122	28.238	28.538	28.273	26.723	27.885	28.083
27	28.250	28.238	28.399	28.273	26.723	27.885	28.093
28	28.079	28.238	28.631	28.273	26.723	27.885	28.083
29	28.122	28.239	28.631	28.273	26.723	27.885	28.083
30	28.207	28.238	28.492	28.273	26.723	27.885	28.083
31	28.292	28.238	28.492	28.273	26.663	27.885	28.083
32	28.122	28.238	28.446	28.233	26.663	27.885	28.083
33	28.207	28.238	28.446	28.273	28.723	27.885	28.083

Figure D6. (cont) Run 5, 11-2-93, ZOC #2 (Raw Data)

79

Scan	Port Number						
	15	16	17	18	19	20	21
1	27.951	28.059	28.196	27.486	14.537	14.156	22.881
2	27.993	28.100	28.196	27.486	14.437	14.195	22.708
3	28.079	28.017	28.196	27.527	14.437	14.116	22.665
4	27.993	28.058	28.196	27.487	14.387	14.236	22.924
5	27.950	27.935	28.196	27.527	14.437	14.315	22.795
6	27.951	28.058	28.196	27.446	14.588	14.315	22.881
7	27.993	27.894	28.196	27.363	14.286	14.155	22.751
8	27.993	27.976	28.196	27.364	14.387	14.156	22.579
9	27.778	27.852	28.196	27.364	14.487	14.235	22.578
10	28.036	28.017	28.196	27.568	14.387	13.996	22.838
11	27.821	27.977	28.196	27.446	14.487	13.957	22.708
12	28.036	27.811	28.196	27.323	14.387	14.235	22.751
13	27.864	27.976	28.196	27.567	14.336	14.196	22.881
14	27.993	27.853	28.196	27.527	14.387	14.436	22.535
15	27.993	27.977	28.196	27.405	14.588	14.275	22.751
16	28.079	27.977	28.196	27.609	14.387	13.996	22.751
17	27.993	27.894	28.196	27.486	14.387	14.156	22.795
18	28.036	28.017	28.196	27.527	14.588	14.076	22.751
19	27.908	28.059	28.196	27.446	14.336	14.315	22.708
20	27.908	27.770	28.196	27.446	14.437	14.116	22.708
21	27.908	27.811	28.196	27.323	14.487	14.116	22.622
22	28.036	28.181	28.196	27.608	14.437	14.155	22.751
23	27.821	27.977	28.196	27.528	14.387	14.275	22.665
24	28.079	27.934	28.196	27.486	14.487	14.156	22.881
25	27.950	28.058	28.196	27.568	14.638	13.957	22.751
26	27.993	27.976	28.196	27.404	14.336	14.235	22.795
27	27.908	27.976	28.196	27.607	14.336	14.195	22.838
28	27.992	28.059	28.196	27.566	14.387	14.196	22.751
29	27.864	27.935	28.196	27.322	14.588	14.115	22.578
30	27.993	28.059	28.196	27.485	14.336	14.196	22.751
31	27.908	27.894	28.196	27.487	14.437	14.156	22.751
32	27.864	27.935	28.196	27.321	14.487	14.116	22.751
33	27.778	27.935	28.196	27.363	14.286	14.436	22.708

Figure D6. (cont) Run 5, 11-2-93, ZOC #2 (Raw Data)

Scan	22	Port Number 23	24	25	26	27	28
1	25.489	27.250	28.065	27.836	28.034	28.186	27.817
2	25.224	26.756	28.065	27.836	28.034	28.186	27.817
3	25.224	27.003	28.065	27.836	28.034	28.186	27.817
4	25.489	27.200	28.065	27.836	28.034	28.186	27.817
5	25.436	27.102	28.065	27.836	28.034	28.186	27.817
6	25.436	27.102	28.065	27.836	28.034	28.186	27.817
7	25.330	26.953	28.065	27.836	28.034	28.186	27.817
8	25.278	26.953	28.065	27.836	28.034	28.186	27.817
9	25.225	26.954	28.065	27.836	28.034	28.186	27.817
10	25.383	27.052	28.065	27.836	28.034	28.186	27.817
11	25.171	27.052	28.065	27.836	28.034	28.186	27.817
12	25.383	27.101	28.065	27.836	28.034	28.186	27.817
13	25.436	27.101	28.065	27.836	28.034	28.186	27.817
14	25.329	27.003	28.065	27.836	28.034	28.186	27.817
15	25.437	26.953	28.065	27.836	28.034	28.186	27.817
16	25.384	26.954	28.065	27.836	28.034	28.186	27.817
17	25.489	27.151	28.065	27.836	28.034	28.186	27.817
18	25.225	26.904	28.065	27.836	28.034	28.186	27.817
19	25.276	27.003	28.065	27.836	28.034	28.186	27.817
20	25.383	26.903	28.065	27.836	28.034	28.186	27.817
21	25.276	26.953	28.065	27.836	28.034	28.186	27.817
22	25.277	27.052	28.065	27.836	28.034	28.186	27.817
23	25.277	27.052	28.065	27.836	28.034	28.186	27.817
24	25.384	27.151	28.065	27.836	28.034	28.186	27.817
25	25.276	26.904	28.065	27.836	28.034	28.186	27.817
26	25.385	27.054	28.014	27.836	28.034	28.186	27.817
27	25.330	27.003	28.065	27.836	28.034	28.186	27.817
28	25.330	26.903	28.065	27.836	28.034	28.186	27.817
29	25.118	26.854	28.065	27.836	28.034	28.186	27.817
30	25.489	27.102	28.065	27.836	28.034	28.186	27.817
31	25.490	27.151	28.065	27.836	28.034	28.186	27.817
32	25.386	26.953	28.065	27.836	28.034	28.186	27.817
33	25.170	26.805	28.014	27.836	28.034	28.186	27.817

Figure D6. (cont) Run 5, 11-2-93, ZOC #2 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	28.104	27.956	27.991	27.370
2	28.104	27.956	27.991	27.370
3	28.104	27.956	27.991	27.370
4	28.104	27.956	27.991	27.412
5	28.104	27.956	27.991	27.370
6	28.104	27.956	27.991	27.412
7	28.104	27.956	27.991	27.370
8	28.104	27.958	27.991	27.412
9	28.104	27.956	27.991	27.412
10	28.104	27.956	27.991	27.412
11	28.104	27.956	27.991	27.412
12	28.104	27.956	27.991	27.412
13	28.104	27.956	27.991	27.412
14	28.104	27.956	27.991	27.370
15	28.104	27.956	27.991	27.370
16	28.104	27.956	27.991	27.412
17	28.104	27.956	27.991	27.412
18	28.104	27.956	27.991	27.412
19	28.104	27.956	27.991	27.370
20	28.104	27.956	27.991	27.412
21	28.104	27.956	27.991	27.370
22	28.104	27.956	27.991	27.412
23	28.104	27.956	27.991	27.327
24	28.104	27.956	27.991	27.370
25	28.104	27.956	27.991	27.412
26	28.104	27.956	27.991	27.412
27	28.104	27.956	27.991	27.412
28	28.104	27.956	27.891	27.412
29	28.104	27.956	27.991	27.412
30	28.104	27.956	27.991	27.412
31	28.104	27.956	27.991	27.412
32	28.104	27.956	27.991	27.370
33	28.104	27.956	27.991	27.370

Figure D6. (cont) Run 5, 11-2-93, ZOC #2 (Raw Data)

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Data Print Out for Zoc # 2 , Run # 1 , FileZR2311241
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port:  10
    Length of data run (sec):    31
    The scan type is:            1
    Number of scans/traverses:   33
    Increment of traverse:       0  Inches
    Atmospheric pressure is:     14.78  psia
    Tunnel Pressure Ratio is:    .995894919844
```

Scan	Port Number 1	2	3	4	5	6	7
1	27.970	28.198	28.127	28.081	28.240	28.462	27.873
2	27.969	28.142	28.127	28.118	28.150	28.305	27.888
3	27.581	28.085	28.127	28.172	28.209	28.431	28.001
4	27.723	28.057	28.127	27.982	28.060	28.305	27.801
5	27.899	28.198	28.189	28.091	28.179	28.399	28.029
6	27.864	28.114	28.127	28.064	28.179	28.400	27.945
7	27.828	28.255	28.127	28.091	28.298	28.305	27.973
8	27.546	28.086	28.127	28.064	28.121	28.336	27.860
9	27.828	28.057	28.127	28.091	28.121	28.399	27.973
10	27.864	28.142	28.127	28.010	27.971	28.210	27.973
11	27.900	28.113	28.127	27.983	28.120	28.305	27.860
12	27.829	28.114	28.127	28.091	28.060	28.273	27.832
13	27.653	28.142	28.127	28.118	28.091	29.336	27.915
14	27.652	28.142	28.127	28.037	28.121	28.273	27.831
15	27.547	28.114	28.127	28.037	28.030	28.242	27.860
16	27.511	28.086	28.127	28.063	28.121	28.368	28.030
17	27.722	27.973	28.127	28.036	28.120	28.242	27.859
18	27.687	27.973	28.043	27.955	28.149	28.305	27.802
19	27.758	27.972	28.043	28.008	27.971	28.241	27.887
20	27.617	28.001	28.001	27.901	28.031	28.273	27.888
21	27.582	28.029	27.919	27.845	27.940	28.210	27.802
22	27.546	28.029	27.878	27.982	28.091	28.305	27.832
23	27.757	28.086	27.834	27.956	28.030	28.242	27.831
24	27.793	27.973	27.834	27.928	28.030	28.368	27.945
25	27.475	27.916	27.834	27.928	27.971	28.145	27.717
26	27.652	28.058	27.792	27.874	27.971	28.083	27.774
27	27.441	27.746	27.750	27.928	27.910	28.082	27.688
28	27.476	27.831	27.834	27.817	28.001	28.178	27.688
29	27.441	27.746	27.760	27.873	27.880	28.179	27.716
30	27.546	27.831	27.750	27.901	27.910	28.083	27.601
31	27.512	27.945	27.750	27.929	27.940	28.242	27.774
32	27.581	27.916	27.709	27.873	27.940	28.210	27.831
33	27.757	27.888	27.750	27.928	27.941	28.178	27.774

Figure D7. Run 1, 11-24-93, ZOC #2 (Raw Data)

Scan	Port Number 8	9	10	11	12	13	14
1	28.386	28.297	28.030	28.432	27.343	28.210	28.321
2	28.268	28.159	28.030	28.432	27.343	28.210	28.287
3	28.326	28.158	28.150	28.532	27.343	28.210	28.321
4	28.117	28.103	27.940	28.457	27.343	28.210	28.321
5	28.267	28.269	28.150	28.531	27.385	28.210	28.321
6	28.208	28.131	28.090	28.532	27.343	28.210	28.287
7	28.208	28.158	28.060	28.507	27.343	28.210	28.287
8	28.267	28.214	28.060	28.432	27.343	28.210	28.321
9	28.268	28.159	28.100	28.507	27.301	28.210	28.321
10	28.207	28.213	28.121	28.457	27.343	28.210	28.321
11	28.237	28.213	28.160	28.557	27.343	28.210	28.321
12	28.148	28.186	27.970	28.383	27.343	28.210	28.321
13	28.207	28.103	27.969	28.557	27.301	28.173	28.254
14	28.207	28.186	27.970	28.532	27.301	28.136	28.186
15	28.267	28.102	28.090	28.533	27.301	28.024	28.220
16	28.178	28.075	28.030	28.507	27.301	28.136	28.254
17	28.237	28.158	28.060	28.433	27.301	28.173	28.254
18	28.147	28.130	28.121	28.557	27.343	28.136	28.287
19	28.207	28.074	28.061	28.432	27.217	28.099	28.186
20	28.117	28.075	28.000	28.307	27.217	28.024	28.084
21	28.237	28.073	27.910	28.458	27.133	27.950	28.118
22	28.207	28.101	28.030	28.483	26.965	27.913	28.050
23	28.148	28.047	28.030	28.307	27.091	27.913	28.084
24	28.087	28.103	28.120	28.383	27.007	27.839	27.982
25	28.057	28.019	28.030	28.408	26.965	27.876	27.982
26	27.966	27.990	27.970	28.357	26.965	27.876	27.982
27	28.087	27.990	27.819	28.308	26.965	27.839	27.982
28	28.027	27.991	27.970	28.408	26.923	27.839	27.982
29	28.178	28.103	27.940	28.333	26.923	27.839	27.982
30	28.027	27.991	28.030	28.332	26.965	27.839	27.982
31	28.087	28.019	27.910	28.308	26.923	27.839	27.982
32	28.057	27.934	27.758	28.231	26.965	27.839	27.982
33	28.057	27.963	27.848	28.231	26.965	27.839	27.982

Figure D7. (cont) Run 1, 11-24-93, ZOC #2 (Raw Data)

Scan	Port Number 15	16	17	18	19	20	21
1	28.032	27.924	28.078	27.342	14.454	14.273	22.692
2	27.975	27.790	28.019	27.314	14.454	14.244	22.510
3	27.919	27.683	27.872	27.287	14.454	14.333	22.449
4	27.973	27.710	28.049	27.314	14.454	14.303	22.570
5	27.890	27.816	28.049	27.205	14.454	14.333	22.479
6	28.032	27.924	28.194	27.205	14.454	14.273	22.601
7	27.947	27.684	27.989	27.177	14.454	14.303	22.479
8	27.890	27.737	27.901	27.149	14.454	14.303	22.388
9	27.891	27.871	28.223	27.314	14.454	14.244	22.540
10	27.863	27.844	28.048	27.260	14.454	14.362	22.631
11	27.948	27.737	27.872	27.149	14.454	14.273	22.418
12	27.919	27.736	27.989	27.148	14.454	14.273	22.479
13	27.976	27.843	28.047	27.314	14.454	14.244	22.631
14	27.948	27.684	28.049	27.260	14.454	14.244	22.479
15	27.862	27.814	28.049	27.232	14.454	14.273	22.479
16	27.946	27.870	28.077	27.287	14.454	14.273	22.631
17	27.976	27.817	27.931	27.149	14.454	14.303	22.418
18	27.975	27.870	28.136	27.288	14.454	14.273	22.570
19	27.748	27.763	27.960	27.315	14.492	14.273	22.570
20	27.804	27.656	27.989	27.259	14.454	14.273	22.509
21	27.862	27.737	27.902	27.039	14.454	14.244	22.297
22	28.003	27.790	27.960	27.149	14.454	14.244	22.479
23	27.891	27.737	27.872	27.232	14.454	14.273	22.601
24	27.778	27.684	27.931	27.260	14.454	14.244	22.449
25	27.890	27.656	27.960	27.315	14.454	14.273	22.570
26	27.834	27.657	27.990	27.149	14.454	14.333	22.510
27	27.805	27.629	27.901	27.176	14.454	14.244	22.449
28	27.919	27.710	27.831	27.122	14.454	14.244	22.449
29	27.719	27.710	27.901	27.010	14.492	14.303	22.449
30	27.805	27.602	27.872	27.287	14.454	14.244	22.449
31	27.834	27.576	27.754	27.094	14.454	14.244	22.479
32	27.805	27.709	27.843	27.120	14.454	14.273	22.449
33	27.634	27.683	27.843	27.204	14.454	14.273	22.449

Figure D7. (cont) Run 1, 11-24-93, ZOC #2 (Raw Data)

Scan	Port Number						
	22	23	24	25	26	27	28
1	25.241	26.085	28.175	28.294	28.397	28.463	28.356
2	25.168	26.820	28.240	28.294	28.397	28.463	28.356
3	25.170	26.756	28.207	28.294	28.397	28.463	28.356
4	25.134	26.659	28.111	28.294	28.397	28.463	28.356
5	25.061	26.659	28.240	28.294	28.397	28.463	28.356
6	25.061	26.758	28.368	28.294	28.397	28.463	28.356
7	25.169	26.723	28.304	28.294	28.397	28.463	28.356
8	24.882	26.691	28.272	28.294	28.397	28.463	28.356
9	25.061	26.788	28.207	28.294	28.397	28.463	28.356
10	25.241	26.756	28.304	28.294	28.397	28.463	28.356
11	24.809	26.627	28.111	28.294	28.397	28.433	28.356
12	25.026	26.627	28.240	28.256	28.397	28.433	28.317
13	25.133	26.885	28.143	28.256	28.365	28.463	28.317
14	25.061	26.691	28.175	28.256	28.397	28.463	28.356
15	24.989	26.465	28.078	28.143	29.333	28.372	28.317
16	25.313	26.756	28.143	28.219	28.397	28.433	28.278
17	25.061	26.691	28.175	28.218	28.397	28.433	28.356
18	25.097	26.788	28.240	28.219	28.333	28.433	28.278
19	25.241	26.659	28.111	26.087	28.301	28.281	28.317
20	25.025	26.659	28.078	28.181	28.365	28.342	28.240
21	24.917	26.627	28.014	28.030	28.237	28.270	28.163
22	25.097	26.595	28.014	28.087	28.140	28.311	28.085
23	24.999	26.530	28.046	27.954	28.172	28.160	28.008
24	24.953	26.595	27.982	27.954	28.108	28.190	28.047
25	25.097	26.627	28.078	27.918	28.076	28.220	27.969
26	25.061	26.724	28.143	27.918	28.076	28.281	28.047
27	24.989	26.401	28.046	27.916	28.076	28.220	28.008
28	24.989	26.627	28.078	27.916	28.076	28.220	28.047
29	25.097	26.594	28.078	27.916	28.076	28.160	27.969
30	24.881	26.530	28.078	27.916	28.076	28.190	28.008
31	25.133	26.724	28.046	27.916	28.076	28.160	27.969
32	25.025	26.627	28.046	27.916	28.076	28.190	27.969
33	24.953	26.594	28.014	27.916	28.076	28.190	27.969

Figure D7. (cont) Run 1, 11-24-93, ZOC #2 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	28.451	28.335	28.309	27.550
2	28.451	28.335	29.309	27.550
3	28.451	28.335	29.309	27.493
4	28.451	28.335	28.309	27.408
5	28.451	28.335	28.309	27.465
6	28.451	28.335	28.309	27.493
7	28.451	28.335	28.309	27.550
8	28.451	28.335	28.309	27.465
9	28.451	28.335	28.272	27.436
10	28.417	28.335	28.309	27.550
11	28.451	28.335	28.309	27.380
12	28.417	28.265	28.309	27.436
13	28.314	28.335	28.235	27.408
14	28.451	28.265	28.272	27.493
15	28.417	28.335	28.235	27.464
16	28.417	28.335	28.197	27.380
17	28.451	28.300	28.197	27.436
18	28.383	28.196	29.235	27.408
19	28.349	28.231	28.123	27.408
20	28.383	28.231	28.123	27.380
21	28.246	28.161	28.048	27.436
22	28.211	28.057	28.085	27.379
23	28.177	28.057	27.973	27.351
24	28.143	27.988	27.936	27.322
25	28.108	28.023	27.973	27.351
26	28.109	27.988	27.936	27.379
27	28.108	27.988	27.936	27.322
28	28.109	27.988	27.936	27.380
29	28.108	27.988	27.936	27.322
30	28.108	27.988	27.936	27.322
31	28.108	27.988	27.936	27.293
32	28.108	27.988	27.936	27.380
33	28.108	27.988	27.936	27.351

Figure D7. (cont) Run 1, 11-24-93, ZOC #2 (Raw Data)

Data Print Out for Zoc # 3 , Run # 7 , File2R2311247
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port: 10
    Length of data run (sec):   31
    The scan type is: 1
    Number of scans/traverses: 33
    Increment of traverse: 0 Inches
    Atmospheric pressure is: 14.70 psia
    Tunnel Pressure Ratio is: .987012156002

Scan	1	Port Number 2	3	4	5	6	7
1	21.451	23.236	25.469	26.545	26.776	27.075	27.380
2	21.253	23.200	25.044	26.490	26.545	26.977	27.208
3	21.334	22.988	25.013	26.401	26.366	26.703	27.085
4	21.332	22.986	24.890	26.430	26.336	26.702	26.979
5	21.293	22.902	24.921	26.310	26.366	26.598	27.010
6	21.131	22.901	24.644	26.131	26.272	26.564	26.959
7	21.213	23.285	24.767	26.101	26.336	26.564	26.882
8	21.213	23.029	24.674	25.981	26.089	26.529	26.884
9	21.051	22.988	24.643	25.951	26.276	26.529	26.858
10	20.888	22.902	24.581	25.951	26.274	26.425	26.832
11	20.888	22.986	24.582	25.980	26.276	26.460	26.781
12	21.214	23.072	24.829	25.980	26.306	26.459	27.011
13	21.571	23.369	25.463	26.634	26.906	27.107	27.422
14	21.611	23.662	25.408	26.931	26.981	27.410	27.614
15	21.293	23.412	25.135	26.549	26.751	26.943	27.328
16	21.253	23.157	25.318	26.667	26.840	27.045	27.405
17	21.251	23.114	24.951	26.755	26.632	26.773	27.209
18	21.414	23.326	25.014	26.400	26.605	26.910	27.257
19	21.132	23.028	24.952	26.277	26.394	26.910	27.306
20	21.250	23.158	25.044	26.577	26.544	26.875	27.136
21	21.007	22.902	25.105	26.608	26.426	26.772	27.160
22	21.252	22.988	25.014	26.520	26.486	26.633	27.060
23	21.253	23.115	25.166	26.428	26.545	26.737	27.111
24	21.373	23.199	24.983	26.519	26.604	26.840	27.207
25	21.051	23.242	24.982	26.341	26.334	26.704	27.160
26	21.330	23.072	25.044	26.459	26.395	26.704	27.062
27	21.252	23.116	24.982	26.222	26.334	26.669	27.059
28	21.414	23.201	24.890	26.489	26.427	26.703	27.136
29	21.051	23.073	24.890	26.370	26.397	26.670	27.135
30	21.330	23.198	25.075	26.430	26.427	26.634	27.035
31	21.091	23.031	24.983	26.431	26.428	26.773	27.061
32	21.010	23.114	25.135	26.488	26.517	26.908	27.083
33	21.091	22.858	24.798	26.367	26.419	26.841	27.208

Figure D8.   Run 7, 11-24-93, ZOC #3 (Raw Data)

88

Scan	Port Number						
	8	9	10	11	12	13	14
1	27.485	27.759	27.789	27.780	27.949	28.451	28.726
2	27.208	27.390	27.422	27.474	27.659	28.205	28.418
3	27.037	27.363	27.371	27.501	27.758	27.970	28.309
4	27.065	27.314	27.319	27.396	27.533	27.944	28.293
5	26.951	27.184	27.293	27.472	27.482	27.944	28.337
6	26.921	27.107	27.319	27.316	27.508	27.944	28.309
7	26.922	27.263	27.137	27.236	27.482	27.944	28.255
8	26.893	27.079	27.190	27.210	27.354	27.917	28.062
9	26.863	27.102	27.268	27.289	27.275	27.863	28.118
10	26.806	27.184	27.137	27.209	27.329	27.754	28.088
11	26.805	27.183	27.137	27.262	27.432	27.700	28.060
12	26.864	27.158	27.292	27.394	27.483	27.863	28.305
13	27.418	27.482	27.631	27.722	27.963	28.522	28.756
14	27.595	27.879	27.805	28.026	28.001	28.743	28.921
15	27.375	27.685	27.716	27.880	28.112	28.649	28.727
16	27.317	27.591	27.764	27.756	27.998	28.504	28.876
17	27.234	27.610	27.668	27.705	27.971	28.456	28.702
18	27.209	27.541	27.648	27.755	27.901	28.456	28.675
19	27.123	27.538	27.496	27.577	27.854	28.456	28.543
20	27.178	27.540	27.571	27.525	27.926	28.331	28.574
21	27.292	27.415	27.421	27.552	27.756	28.256	28.469
22	27.235	27.415	27.571	27.550	27.807	28.205	28.417
23	27.094	27.441	27.544	27.576	27.782	28.205	28.575
24	27.346	27.461	27.446	27.526	27.856	28.205	28.626
25	27.151	27.416	27.445	27.500	27.805	28.205	28.443
26	27.094	27.365	27.496	27.447	27.584	28.205	28.470
27	27.036	27.389	27.546	27.501	27.709	28.205	28.496
28	27.037	27.414	27.397	27.551	27.633	28.205	28.494
29	27.066	27.362	27.446	27.432	27.829	28.205	28.392
30	27.119	27.390	27.545	27.422	27.893	28.205	28.521
31	27.095	27.340	27.320	27.368	27.635	28.205	28.392
32	26.979	27.337	27.495	27.629	27.781	28.153	28.414
33	27.180	27.437	27.498	27.476	27.782	28.153	28.390

Figure D8. (cont) Run 7, 11-24-93, ZOC #3 (Raw Data)

Scan	15	Port Number 16	17	18	19	20	21
1	28.395	28.140	27.847	19.430	22.442	25.035	27.050
2	28.098	27.928	27.510	19.295	22.408	24.933	26.731
3	28.009	27.771	27.544	19.385	22.308	24.761	26.583
4	28.009	27.770	27.544	19.250	22.307	24.796	26.583
5	27.986	27.740	27.413	19.204	22.139	24.553	26.493
6	27.873	27.612	27.282	18.249	22.240	24.623	26.524
7	27.873	27.611	27.281	19.249	22.308	24.623	26.346
8	27.896	27.515	27.284	19.295	22.172	24.483	26.255
9	27.919	27.450	27.122	19.263	22.072	24.484	26.286
10	27.851	27.580	27.283	19.340	22.038	24.519	26.345
11	27.737	27.450	27.176	19.250	22.072	24.448	26.226
12	27.918	27.547	27.283	19.250	22.173	24.569	26.404
13	28.416	28.190	27.812	19.385	22.475	25.066	27.190
14	28.559	28.436	28.043	19.475	22.643	25.240	27.280
15	28.458	28.202	27.869	19.430	22.510	25.104	27.166
16	28.353	28.141	27.923	19.519	22.610	25.070	26.993
17	28.374	28.020	27.872	19.385	22.476	24.900	26.993
18	28.269	28.111	27.747	19.385	22.677	25.070	27.022
19	28.289	28.020	27.699	19.250	22.376	24.866	26.935
20	28.248	27.928	27.672	19.295	22.577	24.831	26.818
21	28.229	27.928	27.698	19.430	22.341	24.900	26.848
22	28.184	27.894	27.597	19.340	22.509	24.830	26.877
23	28.249	27.927	27.673	19.340	22.409	24.865	26.818
24	28.228	27.896	27.596	19.385	22.443	24.796	26.790
25	28.162	27.958	27.544	19.430	22.375	24.797	26.760
26	28.163	27.771	27.519	19.430	22.308	24.693	26.847
27	28.185	27.740	27.572	19.295	22.375	24.762	26.730
28	28.206	27.863	27.596	19.340	22.375	24.831	26.731
29	28.229	27.834	27.597	19.385	22.307	24.762	26.789
30	28.162	27.834	27.597	19.295	22.274	24.797	26.818
31	28.141	27.803	27.519	19.385	22.342	24.693	26.731
32	28.227	27.866	27.648	19.295	22.240	24.864	26.758
33	28.162	27.803	27.544	19.250	22.342	24.797	26.789

Figure D8. (cont) Run 7, 11-24-93, ZOC #3 (Raw Data)

Scan	Port Number						
	22	23	24	25	26	27	28
1	27.728	27.427	28.466	27.520	27.992	26.139	28.495
2	27.425	27.254	28.111	27.150	27.582	25.826	28.244
3	27.313	27.153	27.992	27.096	27.582	25.826	28.133
4	27.341	27.128	27.842	26.560	27.487	25.769	28.045
5	27.256	27.076	27.842	26.905	27.359	25.738	28.023
6	27.115	27.050	27.842	26.933	27.327	25.710	28.023
7	27.143	27.076	27.842	26.933	27.327	25.651	28.000
8	27.200	27.076	27.812	26.821	27.295	25.651	28.023
9	27.087	26.921	27.782	26.821	27.231	25.651	28.000
10	27.087	26.921	27.721	26.849	27.264	25.622	27.978
11	27.058	26.895	27.571	26.765	27.199	25.534	27.841
12	27.228	27.023	27.782	26.932	27.391	25.622	28.000
13	27.831	27.562	28.489	27.507	28.176	26.271	28.540
14	28.000	27.716	28.759	27.723	28.336	26.306	28.701
15	27.865	27.621	28.642	27.545	28.180	26.111	28.641
16	27.838	27.501	28.437	27.442	27.981	26.055	28.456
17	27.701	27.476	28.437	27.389	27.961	26.083	28.456
18	27.701	27.403	28.407	27.442	27.930	26.055	28.456
19	27.591	27.378	28.289	27.310	27.867	25.969	28.456
20	27.619	27.354	28.289	27.231	27.899	25.912	28.435
21	27.591	27.329	28.141	27.231	27.899	25.969	28.307
22	27.564	27.304	28.141	27.203	27.804	25.855	28.265
23	27.591	27.353	28.141	27.204	27.835	25.893	28.244
24	27.647	27.354	28.141	27.204	27.835	25.893	28.244
25	27.619	27.279	28.141	27.177	27.867	25.826	28.244
26	27.452	27.304	28.141	27.203	27.646	25.797	28.244
27	27.591	27.279	28.141	27.177	27.709	25.797	28.244
28	27.536	27.228	28.111	27.177	27.772	25.797	28.244
29	27.536	27.329	28.141	27.231	27.804	25.893	28.244
30	27.508	27.354	28.141	27.204	27.677	25.797	28.244
31	27.508	27.254	28.111	27.177	27.677	25.797	28.244
32	27.425	27.303	28.141	27.150	27.709	25.797	28.244
33	27.452	27.228	28.111	27.123	27.646	25.769	28.199

Figure D8. (cont) Run 7, 11-24-93, ZOC #3 (Raw Data)

91

Scan	Port Number			
	29	30	31	32
1	28.463	28.093	27.728	14.438
2	28.172	27.908	27.440	14.399
3	27.983	27.788	27.342	14.399
4	27.956	27.715	27.267	14.438
5	27.956	27.716	27.267	14.438
6	27.956	27.642	27.243	14.477
7	27.956	27.592	27.216	14.477
8	27.901	27.617	27.218	14.477
9	27.791	27.542	27.167	14.477
10	27.709	27.567	27.116	14.477
11	27.681	27.493	27.090	14.477
12	27.901	27.667	27.267	14.438
13	28.606	28.130	27.717	14.438
14	28.774	28.363	27.867	14.283
15	28.671	28.186	27.752	14.438
16	28.516	28.164	27.634	14.399
17	28.490	28.140	27.634	14.399
18	28.490	28.071	27.634	14.477
19	28.490	28.024	27.610	14.399
20	28.438	27.932	27.586	14.399
21	28.279	28.001	27.539	14.360
22	28.279	27.955	27.515	14.399
23	28.226	27.908	27.514	14.438
24	28.226	27.955	27.538	14.438
25	28.226	27.931	27.538	14.438
26	28.226	27.908	27.513	14.438
27	28.226	27.932	27.491	14.399
28	28.226	27.860	27.466	14.477
29	28.226	27.906	27.465	14.399
30	28.226	27.884	27.466	14.438
31	28.226	27.908	27.441	14.399
32	28.172	27.860	27.466	14.477
33	28.226	27.812	27.490	14.399

Figure D8. (cont) Run 7, 11-24-93, ZOC #3 (Raw Data)

```
Data Print Out for Zoc # 3 , Run # 1 , File:ZR3312011
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz):  330
    Number of samples per port:   10
    Length of data run (sec):     30.0606060606
    The scan type is:             1
    Number of scans/traverses:    32
    Increment of traverse:        0  Inches
    Atmospheric pressure is:      14.88  psia
    Tunnel Pressure Ratio is:     .903719208144
```

Scan	Port Number 1	2	3	4	5	6	7
1	15.054	14.665	16.540	19.526	21.707	22.977	24.104
2	15.021	14.574	16.959	19.893	21.818	23.404	24.298
3	14.991	14.563	16.968	19.672	22.149	23.802	24.336
4	15.031	14.836	16.823	19.367	21.482	22.945	24.130
5	15.018	15.069	16.742	20.238	22.231	23.596	24.366
6	15.078	15.089	17.797	20.119	22.213	23.522	24.450
7	15.058	14.850	16.905	20.001	22.008	23.577	24.232
8	15.048	14.596	16.867	19.745	21.834	23.601	24.191
9	15.008	14.530	16.560	19.015	21.231	22.987	24.111
10	15.108	14.803	16.855	19.462	21.967	23.072	24.208
11	15.031	14.731	16.892	19.458	21.883	23.205	24.194
12	15.004	14.726	17.048	19.643	21.976	23.370	24.387
13	15.041	14.567	16.805	19.513	21.557	23.063	24.150
14	15.064	14.829	17.324	20.032	22.320	23.683	24.544
15	15.121	14.942	17.432	19.848	21.777	23.550	24.496
16	15.101	14.986	17.451	18.726	22.005	23.144	24.311
17	15.094	14.872	17.028	19.600	22.086	23.312	24.271
18	15.059	14.530	16.478	19.072	21.530	23.254	24.456
19	14.994	14.475	16.278	18.675	21.260	22.716	23.993
20	15.101	14.898	16.639	19.431	21.799	23.119	24.191
21	14.981	14.424	16.620	19.090	21.516	23.549	24.256
22	15.138	15.039	17.256	20.106	22.321	23.614	24.686
23	15.028	15.087	17.355	20.189	22.160	23.524	24.480
24	15.091	14.738	16.895	19.834	22.116	23.327	24.295
25	15.104	14.822	16.843	19.780	21.963	23.531	24.267
26	15.004	14.909	17.081	19.585	21.512	23.373	24.151
27	15.081	14.942	17.294	20.015	21.729	23.139	24.096
28	15.031	15.079	16.916	19.966	21.924	23.248	24.186
29	15.001	14.785	16.822	19.621	22.248	23.782	24.363
30	15.117	14.893	16.841	19.253	21.779	23.410	24.281
31	15.041	14.833	17.202	19.688	22.128	23.456	24.202
32	14.997	14.672	16.889	19.158	21.417	22.753	24.030

Figure D9. Run 1, 12-01-93, ZOC #3 (Raw Data)

Scan	Port Number						
	8	9	10	11	12	13	14
1	25.165	25.595	25.968	26.213	26.552	27.563	27.317
2	24.945	25.509	25.842	26.302	26.439	27.544	27.208
3	25.173	25.587	25.848	26.151	26.496	27.476	27.234
4	25.047	25.504	25.929	26.275	26.570	27.448	27.194
5	25.032	25.609	26.037	26.291	26.535	27.535	27.331
6	25.143	25.707	25.928	26.239	26.564	27.488	27.394
7	25.134	25.592	25.938	26.185	26.660	27.216	27.224
8	24.981	25.546	25.835	26.269	26.603	27.427	27.261
9	25.028	25.819	25.886	26.080	26.558	27.392	27.377
10	25.041	25.739	25.959	26.325	26.597	27.578	27.261
11	25.140	25.672	26.040	26.280	26.558	27.507	27.141
12	25.045	25.759	25.982	26.300	26.508	27.501	27.260
13	24.831	25.588	25.998	26.457	26.686	27.513	27.390
14	25.208	25.800	25.974	26.320	26.502	27.547	27.298
15	25.149	25.929	26.116	26.524	26.636	27.377	27.320
16	25.086	25.643	25.805	26.299	26.660	27.452	27.328
17	25.269	25.822	26.127	26.190	26.689	27.544	27.314
18	24.951	25.687	25.865	26.089	26.514	27.485	27.134
19	24.884	25.488	25.914	26.240	26.442	27.495	27.134
20	24.909	25.638	25.874	26.230	26.638	27.349	27.284
21	25.002	25.511	25.991	25.993	26.627	27.371	27.211
22	25.162	25.681	25.784	26.024	26.552	27.402	27.237
23	24.995	25.806	26.036	26.184	26.624	27.411	27.337
24	24.990	25.710	25.969	26.117	26.564	27.359	27.099
25	25.099	25.505	25.845	26.106	26.627	27.454	27.187
26	24.972	25.517	25.986	26.140	26.481	27.498	27.108
27	24.999	25.500	25.706	26.285	26.585	27.405	27.314
28	24.728	25.447	25.890	26.089	26.487	27.275	27.161
29	25.160	25.710	25.797	26.176	26.585	27.476	27.311
30	25.081	25.678	25.914	26.219	26.502	27.493	27.077
31	25.054	25.600	25.883	26.174	26.558	27.415	27.404
32	24.655	25.439	25.742	26.021	26.516	27.305	27.135

Figure D9.   (cont) Run 1, 12-01-93, ZOC #3 (Raw Data)

94

Scan	Port Number						
	15	16	17	18	19	20	21
1	26.601	26.251	25.747	16.985	17.484	17.916	17.423
2	26.446	26.379	25.943	17.045	17.538	17.935	17.443
3	26.591	26.264	25.858	17.034	17.497	17.975	17.495
4	26.479	26.254	26.000	17.034	17.500	17.952	17.429
5	26.626	26.261	25.863	16.978	17.470	17.949	17.479
6	26.915	26.515	26.035	17.017	17.396	17.929	17.440
7	26.815	26.076	26.021	17.066	17.484	17.959	17.445
8	26.490	26.145	25.631	17.048	17.495	17.962	17.476
9	26.715	26.344	25.944	17.052	17.380	17.946	17.484
10	26.796	26.386	25.959	17.034	17.443	17.933	17.470
11	26.473	26.163	25.744	17.045	17.566	17.982	17.451
12	26.634	26.222	26.038	16.989	17.437	17.933	17.495
13	26.782	26.476	26.073	17.055	17.443	17.995	17.520
14	26.518	26.438	25.907	17.076	17.478	17.955	17.465
15	26.639	26.313	25.777	17.024	17.478	17.965	17.454
16	26.637	26.146	25.988	17.013	17.418	17.900	17.479
17	26.534	26.285	25.920	17.010	17.426	17.991	17.537
18	26.571	26.222	25.708	17.076	17.470	17.913	17.529
19	26.532	26.020	25.905	17.055	17.459	17.965	17.520
20	26.424	26.338	25.786	17.010	17.435	17.933	17.490
21	26.653	26.230	25.846	16.989	17.443	17.910	17.531
22	26.455	26.090	25.821	16.999	17.410	17.926	17.573
23	26.534	26.201	25.907	17.031	17.448	17.913	17.495
24	26.370	26.229	25.831	16.999	17.462	17.956	17.476
25	26.500	26.236	25.788	17.066	17.454	17.864	17.468
26	26.520	26.099	25.747	17.013	17.421	17.923	17.537
27	26.520	26.271	25.890	17.038	17.437	17.894	17.551
28	26.488	26.072	25.720	17.010	17.366	17.877	17.548
29	26.519	26.159	25.818	16.975	17.358	17.825	17.529
30	26.617	26.048	25.860	16.989	17.372	17.835	17.545
31	26.737	26.226	25.917	17.010	17.421	17.929	17.506
32	26.631	26.229	25.812	16.940	17.391	17.864	17.498

Figure D9. (cont) Run 1, 12-01-93, ZOC #3 (Raw Data)

Scan	22	Port Number 23	24	25	26	27	28
1	16.666	15.843	18.031	21.394	21.189	20.345	21.877
2	16.634	15.834	17.991	21.385	21.198	20.345	21.824
3	16.646	15.794	18.012	21.436	21.222	20.345	21.793
4	16.660	15.840	17.938	21.421	21.162	20.342	21.846
5	16.660	15.825	18.020	21.442	21.189	20.348	21.983
6	16.666	15.862	17.959	21.388	21.179	20.378	21.791
7	16.680	15.853	18.086	21.382	21.192	20.333	21.885
8	16.663	15.922	17.954	21.391	21.189	20.360	21.874
9	16.703	15.810	17.726	21.427	21.230	20.402	21.827
10	16.694	15.862	17.837	21.370	21.222	20.387	21.768
11	16.674	15.834	18.110	21.391	21.200	20.333	21.852
12	16.669	15.853	17.890	21.430	21.200	20.354	21.779
13	16.734	15.822	17.893	21.439	21.206	20.351	21.821
14	16.691	15.840	17.901	21.400	21.211	20.357	21.799
15	16.714	15.880	17.943	21.373	21.200	20.378	21.718
16	16.689	15.847	17.692	21.397	21.225	20.381	21.671
17	16.694	15.877	17.877	21.424	21.184	20.357	21.824
18	16.672	15.806	17.785	21.387	21.181	20.348	21.824
19	16.700	15.928	17.837	21.403	21.227	20.381	21.732
20	16.694	15.822	17.930	21.376	21.200	20.342	21.749
21	16.729	15.856	17.532	21.334	21.208	20.422	21.740
22	16.706	15.782	17.848	21.400	21.206	20.375	21.632
23	16.700	15.847	17.935	21.445	21.211	20.351	21.824
24	16.697	15.843	17.877	21.424	21.243	20.390	21.816
25	16.749	15.896	17.755	21.421	21.273	20.405	21.819
26	16.731	15.862	17.726	21.376	21.230	20.402	21.732
27	16.731	15.847	17.856	21.400	21.208	20.354	21.807
28	16.780	15.939	17.561	21.343	21.225	20.408	21.665
29	16.780	15.936	17.548	21.328	21.214	20.390	21.749
30	16.777	15.865	17.691	21.412	21.235	20.405	21.768
31	16.720	15.831	17.742	21.331	21.200	20.369	21.651
32	16.720	15.831	17.577	21.379	21.243	20.369	21.648

Figure D9. (cont) Run 1, 12-01-93, ZOC #3 (Raw Data)

96

Scan	Port Number			
	29	30	31	32
1	20.432	18.464	16.566	14.590
2	20.499	18.443	16.553	14.614
3	20.344	18.370	16.500	14.596
4	20.372	18.443	16.528	14.590
5	20.477	18.534	16.562	14.596
6	20.299	18.264	16.417	14.620
7	20.420	18.437	16.562	14.614
8	20.355	18.346	16.513	14.608
9	20.412	18.364	16.485	14.605
10	20.319	18.319	16.522	14.602
11	20.338	18.461	16.525	14.611
12	20.395	18.355	16.541	14.617
13	20.415	18.419	16.516	14.590
14	20.310	18.243	16.451	14.611
15	20.341	18.273	16.473	14.611
16	20.296	18.210	16.451	14.611
17	20.381	18.425	16.575	14.608
18	20.341	18.413	16.522	14.605
19	20.355	18.373	16.491	14.614
20	20.293	18.346	16.500	14.590
21	20.313	18.210	16.507	14.587
22	20.174	18.228	16.457	14.614
23	20.392	18.343	16.513	14.596
24	20.327	18.307	16.510	14.602
25	20.341	18.358	16.466	14.599
26	20.240	18.189	16.438	14.608
27	20.307	18.252	16.448	14.602
28	20.198	18.140	16.432	14.608
29	20.259	18.240	16.479	14.599
30	20.316	18.249	16.423	14.593
31	20.285	18.198	16.411	14.620
32	20.200	18.095	16.407	14.614

Figure D9. (cont) Run 1, 12-01-93, ZOC #3 (Raw Data)

```
Data Print Out for Zoc # 3 , Run # 6 , File:ZR3312016
     Period between samples (sec): .0030303030303
     Sample collection rate (Hz): 330
     Number of samples per port:   10
     Length of data run (sec):    30.0606060606
     The scan type is:             1
     Number of scans/traverses:   32
     Increment of traverse:        0   Inches
     Atmospheric pressure is:     14.88  psia
     Tunnel Pressure Ratio is:    .906807383704
```

Scan	1	Port Number 2	3	4	5	6	7
1	15.265	15.215	17.353	20.247	22.211	23.625	24.416
2	15.315	15.229	17.513	20.274	22.127	23.768	24.566
3	15.312	14.901	17.087	19.569	21.809	23.175	24.135
4	15.224	14.764	16.736	19.346	21.731	23.233	23.947
5	15.293	15.099	17.588	19.989	22.021	23.522	24.163
6	15.255	14.983	17.097	19.414	21.825	23.154	24.197
7	15.305	15.260	17.154	19.900	22.133	23.321	24.243
8	15.308	15.013	17.064	19.328	21.644	22.800	24.288
9	15.293	15.010	17.128	19.696	22.261	23.498	24.427
10	15.312	15.065	17.387	20.045	21.971	23.723	24.399
11	15.283	14.990	17.126	20.260	22.161	23.629	24.598
12	15.283	14.990	16.945	19.594	21.803	23.113	24.356
13	15.296	14.921	17.002	19.500	21.962	23.011	23.896
14	15.343	15.219	17.350	20.316	22.373	23.454	24.538
15	15.280	15.174	17.557	19.821	22.223	23.597	24.248
16	15.274	15.020	17.503	20.578	22.519	23.965	24.669
17	15.305	14.948	17.048	19.455	21.803	23.468	24.123
18	15.352	15.448	17.763	20.574	22.199	23.594	24.308
19	15.324	15.198	17.407	19.990	21.937	23.495	24.376
20	15.355	14.918	17.206	19.683	21.788	23.774	24.325
21	15.299	15.055	17.397	19.591	21.968	23.015	24.280
22	15.290	14.829	16.752	19.083	21.277	23.355	24.143
23	15.249	14.979	16.968	19.956	22.248	23.290	24.103
24	15.362	15.208	17.572	20.325	22.473	23.832	24.634
25	15.308	15.000	17.183	19.275	21.881	23.103	24.200
26	15.293	14.945	16.703	19.409	21.741	23.297	24.200
27	15.368	15.034	17.056	19.632	21.666	23.260	24.010
28	15.487	15.475	17.748	20.449	22.314	23.304	24.518
29	15.318	14.918	16.697	19.288	21.607	23.059	24.214
30	15.299	15.144	17.309	19.895	22.226	23.352	24.532
31	15.462	15.448	17.258	20.176	22.074	23.410	24.333
32	15.299	15.089	16.687	19.589	21.660	23.314	24.251

Figure D10.   Run 6. 12-01-93, ZOC #3 (Raw Data)

Scan	Port Number						
	8	9	10	11	12	13	14
1	25.057	25.793	26.255	26.284	26.565	27.710	27.427
2	25.364	25.870	26.075	26.416	26.470	27.846	27.495
3	25.057	25.633	26.066	26.360	26.792	27.663	27.484
4	24.922	25.839	25.960	26.249	26.504	27.633	27.142
5	25.328	25.891	26.004	26.302	26.851	27.746	27.593
6	25.150	25.627	26.134	26.308	26.783	27.647	27.470
7	24.922	25.677	26.029	26.314	26.656	27.640	27.523
8	25.033	25.585	25.852	26.457	26.656	27.627	27.357
9	25.214	25.814	26.056	26.293	26.830	27.604	27.484
10	25.242	25.665	26.091	26.156	26.715	27.577	27.392
11	25.223	25.751	26.029	26.375	26.724	27.706	27.484
12	25.159	25.748	25.948	26.369	26.585	27.726	27.269
13	24.882	25.502	25.923	26.302	26.737	27.660	27.378
14	25.229	25.695	26.100	26.243	26.715	27.643	27.435
15	25.131	25.839	25.982	26.264	26.637	27.560	27.473
16	25.242	25.956	26.128	26.276	26.668	27.610	27.505
17	24.959	25.728	26.063	26.287	26.668	27.667	27.435
18	25.214	25.612	25.976	26.284	26.749	27.743	27.420
19	25.137	25.704	26.091	26.138	26.854	27.647	27.374
20	25.137	25.784	26.025	26.264	26.473	27.740	27.304
21	25.236	25.742	26.150	26.287	26.870	27.720	27.505
22	25.082	25.849	25.966	26.308	26.743	27.574	27.276
23	25.021	25.665	25.970	26.306	26.668	27.597	27.212
24	25.321	25.754	26.109	26.410	26.730	27.693	27.523
25	24.907	25.627	26.072	26.424	26.622	27.680	27.336
26	25.014	25.760	25.998	26.240	26.718	27.564	27.367
27	24.879	25.591	26.108	26.144	26.678	27.633	27.382
28	25.300	25.683	26.060	26.316	26.737	27.806	27.442
29	24.812	25.627	25.973	26.398	26.690	27.610	27.283
30	25.309	25.736	26.122	26.270	26.656	27.756	27.374
31	25.079	25.710	25.898	26.228	26.675	27.594	27.382
32	25.073	25.505	25.889	26.261	26.516	27.550	27.262

Figure D10.   (cont) Run 6, 12-01-93, ZOC #3 (Raw Data)

Scan	15	Port Number 16	17	18	19	20	21
1	26.592	26.292	25.942	17.333	17.708	18.152	17.717
2	26.767	26.679	26.074	17.336	17.794	18.174	17.693
3	26.738	26.347	25.929	17.350	17.778	18.208	17.748
4	26.650	26.010	25.929	17.326	17.742	18.128	17.675
5	26.764	26.426	26.139	17.373	17.771	18.227	17.690
6	26.690	26.282	25.914	17.330	17.750	18.155	17.680
7	26.673	26.437	25.865	17.376	17.778	18.183	17.714
8	26.713	26.296	25.874	17.386	17.729	18.199	17.704
9	26.590	26.553	25.973	17.366	17.763	18.152	17.696
10	26.555	26.394	25.963	17.366	17.763	18.140	17.656
11	26.755	26.372	26.010	17.346	17.755	18.190	17.688
12	26.475	26.180	25.806	17.396	17.739	18.218	17.740
13	26.387	26.285	25.732	17.393	17.799	18.202	17.672
14	26.664	26.437	25.824	17.400	17.781	18.211	17.730
15	26.898	26.419	26.034	17.370	17.745	18.177	17.680
16	26.630	26.415	25.812	17.350	17.695	18.205	17.709
17	26.564	26.473	26.044	17.353	17.807	18.214	17.675
18	26.827	26.415	26.044	17.366	17.789	18.214	17.664
19	26.864	26.491	26.114	17.346	17.766	18.221	17.690
20	26.678	26.242	25.880	17.383	17.755	18.227	17.743
21	26.801	26.329	26.173	17.353	17.742	18.190	17.709
22	26.673	26.173	25.732	17.363	17.742	18.177	17.693
23	26.507	26.216	25.960	17.330	17.872	18.354	17.735
24	26.650	26.542	25.914	17.396	17.802	18.249	17.719
25	26.555	26.347	25.911	17.400	17.765	18.252	17.696
26	26.590	26.354	25.914	17.383	17.815	18.242	17.730
27	26.907	26.462	25.997	17.386	17.804	18.218	17.690
28	26.824	26.513	26.034	17.350	17.804	18.221	17.740
29	26.595	26.390	25.840	17.383	17.786	18.230	17.717
30	26.690	26.412	25.997	17.373	17.849	18.267	17.672
31	26.458	26.296	25.861	17.409	17.854	18.236	17.690
32	26.541	26.155	25.775	17.426	17.793	18.259	17.704

Figure D10. (cont) Run 6, 12-01-93, ZOC #3 (Raw Data)

100

Scan	Port Number						
	22	23	24	25	26	27	28
1	16.936	16.129	18.338	21.544	21.278	20.433	22.017
2	16.909	16.111	18.255	21.523	21.263	20.419	22.094
3	16.960	16.149	18.290	21.541	21.305	20.410	22.064
4	16.928	16.082	18.277	21.479	21.265	20.390	21.973
5	16.909	16.097	18.426	21.520	21.286	20.405	21.990
6	16.898	16.111	18.406	21.488	21.271	20.376	21.995
7	16.901	16.106	18.227	21.488	21.297	20.410	21.979
8	16.904	16.129	18.224	21.479	21.315	20.410	21.951
9	16.931	16.106	18.328	21.532	21.297	20.439	22.039
10	16.890	16.097	18.303	21.547	21.252	20.407	21.995
11	16.901	16.117	18.429	21.526	21.281	20.405	22.020
12	16.909	16.097	18.292	21.465	21.257	20.422	21.951
13	16.887	16.117	18.492	21.561	21.292	20.422	22.143
14	16.901	16.094	18.366	21.447	21.289	20.428	22.014
15	16.887	16.114	18.426	21.494	21.286	20.407	22.033
16	16.912	16.108	18.411	21.538	21.252	20.396	22.044
17	16.882	16.094	18.310	21.558	21.271	20.402	22.036
18	16.874	16.123	18.452	21.482	21.278	20.402	21.976
19	16.893	16.100	18.414	21.541	21.289	20.396	22.061
20	16.923	16.091	18.391	21.544	21.278	20.376	22.042
21	16.869	16.062	18.507	21.555	21.271	20.379	21.965
22	16.909	16.137	18.441	21.520	21.276	20.382	22.014
23	16.882	16.085	18.479	21.544	21.276	20.416	22.086
24	16.882	16.094	18.444	21.538	21.276	20.410	22.006
25	16.904	16.085	18.492	21.555	21.286	20.416	22.099
26	16.904	16.103	18.351	21.514	21.268	20.425	22.011
27	16.879	16.135	18.431	21.553	21.276	20.410	22.072
28	16.912	16.140	19.457	21.570	21.310	20.422	22.086
29	16.898	16.132	18.363	21.482	21.281	20.433	21.990
30	16.887	16.111	18.373	21.529	21.281	20.413	22.066
31	16.877	16.143	18.510	21.544	21.307	20.425	22.039
32	16.896	16.137	18.462	21.523	21.286	20.413	22.042

Figure D10. (cont) Run 6, 12-01-93, ZOC #3 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	20.628	18.705	16.736	14.865
2	20.661	18.781	16.774	14.860
3	20.652	18.694	16.803	14.846
4	20.545	18.601	16.753	14.857
5	20.567	18.694	16.739	14.851
6	20.600	18.598	16.774	14.849
7	20.600	18.575	16.791	14.846
8	20.578	18.575	16.777	14.851
9	20.685	18.691	16.759	14.851
10	20.532	18.647	16.742	14.860
11	20.595	18.650	16.745	14.865
12	20.518	18.624	16.748	14.846
13	20.639	18.792	16.809	14.851
14	20.641	18.656	16.780	14.863
15	20.608	18.689	16.753	14.860
16	20.595	18.708	16.791	14.851
17	20.636	18.723	16.806	14.865
18	20.534	18.642	16.794	14.868
19	20.606	18.697	16.765	14.868
20	20.592	18.772	16.806	14.857
21	20.614	18.731	16.806	14.843
22	20.683	18.775	16.844	14.871
23	20.597	18.731	16.815	14.879
24	20.584	18.720	16.753	14.860
25	20.696	18.850	16.865	14.863
26	20.581	18.653	16.771	14.854
27	20.619	18.795	16.809	14.849
28	20.589	18.708	16.794	14.851
29	20.633	18.627	16.789	14.865
30	20.608	18.699	16.847	14.860
31	20.567	18.708	16.809	14.860
32	20.628	18.702	16.815	14.854

Figure D10. (cont) Run 6, 12-01-93, ZOC #3 (Raw Data)

Data Print Out for Zoc # 2 , Run # 8 , FileZR2312018
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port: 10
    Length of data run (sec): 30.0606060606
    The scan type is: 1
    Number of scans/traverses: 32
    Increment of traverse: 0 Inches
    Atmospheric pressure is: 14.87 psia
    Tunnel Pressure Ratio is: .9497352659879

Scan		Port Number					
	1	2	3	4	5	6	7
1	20.461	23.027	24.346	25.848	26.395	27.137	27.316
2	19.575	22.359	24.149	25.478	26.474	26.918	27.361
3	20.229	22.451	24.434	25.757	26.539	27.051	27.287
4	19.710	22.049	24.182	25.631	26.402	26.946	27.296
5	20.089	22.305	24.136	25.628	26.323	26.937	27.293
6	20.331	22.545	24.520	25.725	26.716	27.172	27.438
7	20.356	22.884	24.793	26.007	26.588	27.134	27.374
8	19.624	22.469	23.855	25.696	26.487	26.956	27.258
9	20.140	22.730	24.179	25.670	26.336	27.229	27.409
10	20.052	22.502	24.078	25.822	26.605	27.019	27.258
11	20.009	22.284	24.340	25.712	26.320	26.930	27.316
12	20.732	22.612	24.222	25.835	26.579	27.067	27.338
13	19.947	22.740	24.426	25.793	26.422	27.067	27.335
14	19.592	22.264	24.440	25.608	26.431	26.940	27.258
15	20.342	22.937	24.159	25.676	26.431	26.956	27.264
16	20.235	22.443	24.389	25.790	26.307	27.039	27.322
17	19.618	22.079	23.893	25.436	26.300	27.019	27.258
18	20.046	22.277	24.283	25.621	26.533	27.048	27.416
19	20.428	22.474	24.328	25.498	26.369	26.845	27.258
20	20.127	22.687	24.062	25.757	26.340	26.876	27.419
21	19.124	21.918	23.643	25.102	26.307	26.775	27.219
22	19.815	22.187	23.993	25.663	26.395	26.762	27.303
23	20.251	22.714	24.228	25.942	26.546	27.026	27.371
24	20.100	22.177	24.099	25.501	26.428	26.937	27.367
25	20.345	22.958	24.787	25.958	26.556	27.000	27.345
26	20.089	22.807	24.414	25.913	26.664	27.032	27.322
27	20.235	22.307	24.260	26.884	26.513	26.940	27.329
28	20.485	22.195	24.217	25.430	26.317	26.873	27.097
29	20.235	22.469	24.214	25.832	26.528	27.099	27.345
30	20.256	22.561	24.202	25.624	26.471	26.930	27.383
31	19.750	22.443	24.174	25.838	26.546	26.937	27.261
32	20.038	22.548	24.093	25.676	26.359	26.992	27.174

Figure D11. Run 8, 12-01-93, ZOC #2 (Raw Data)

103

| Scan | Port Number | | | | | | |
	8	9	10	11	12	13	14
1	27.519	27.507	27.730	27.853	27.762	27.678	26.147
2	27.589	27.454	27.817	27.947	27.767	27.488	26.201
3	27.453	27.319	27.749	27.870	27.647	27.544	26.068
4	27.526	27.445	27.669	27.967	27.487	27.559	26.076
5	27.312	27.520	27.797	27.812	27.813	27.470	26.226
6	27.501	27.601	27.759	27.798	27.795	27.690	26.226
7	27.491	27.576	27.778	27.779	27.627	27.551	26.185
8	27.494	27.513	27.630	27.798	27.553	27.357	26.124
9	27.529	27.448	27.643	27.875	27.663	27.468	26.073
10	27.507	27.454	27.543	28.044	27.792	27.402	26.190
11	27.507	27.407	27.659	27.792	27.602	27.521	26.139
12	27.328	27.485	27.846	27.897	27.884	27.531	26.190
13	27.387	27.419	27.665	27.906	27.482	27.602	26.109
14	27.573	27.554	27.810	27.884	27.660	27.609	26.206
15	27.394	27.554	27.814	27.709	27.764	27.455	26.257
16	27.466	27.463	27.868	27.848	27.686	27.602	26.045
17	27.526	27.507	27.733	27.834	27.726	27.422	26.081
18	27.526	27.501	27.772	27.903	27.701	27.582	26.150
19	27.450	27.535	27.665	27.859	27.597	27.334	26.208
20	27.507	27.310	27.833	27.859	27.586	27.427	26.004
21	27.485	27.526	27.698	27.867	27.785	27.263	25.989
22	27.463	27.504	27.907	27.662	27.609	27.569	26.088
23	27.557	27.463	27.855	27.753	27.635	27.645	26.201
24	27.532	27.466	27.704	27.986	27.693	27.645	26.178
25	27.696	27.538	27.595	27.900	27.792	27.549	26.213
26	27.587	27.698	27.817	27.795	27.971	27.455	26.224
27	27.400	27.520	27.630	27.903	27.640	27.389	26.165
28	27.321	27.470	27.659	27.899	27.696	27.420	26.221
29	27.501	27.582	27.691	27.992	27.876	27.639	26.121
30	27.475	27.463	27.688	27.765	27.803	27.463	26.175
31	27.419	27.338	27.707	27.781	27.686	27.334	26.093
32	27.479	27.482	27.640	27.854	27.683	27.458	26.216

Figure D11. (cont) Run 8, 12-01-93, ZOC #2 (Raw Data)

Scan	15	Port Number 16	17	18	19	20	21
1	26.728	26.452	26.049	25.735	14.800	17.360	17.082
2	26.609	26.182	25.979	25.659	14.787	17.373	17.064
3	26.615	26.206	26.060	25.466	14.775	17.365	17.108
4	26.426	26.246	25.755	25.416	14.806	17.363	17.056
5	26.593	26.317	25.932	25.574	14.834	17.365	17.061
6	26.802	26.517	26.157	25.979	14.787	17.363	17.017
7	26.577	26.443	26.113	25.574	14.797	17.352	17.080
8	26.291	26.372	25.982	25.689	14.763	17.355	17.082
9	26.420	26.280	25.865	25.577	14.747	17.350	17.077
10	26.684	25.997	25.909	25.853	14.797	17.360	17.061
11	26.546	26.237	25.915	25.354	14.806	17.355	17.085
12	26.819	26.674	26.226	25.788	14.803	17.360	17.124
13	26.373	26.354	26.023	25.545	14.809	17.360	17.043
14	26.546	26.132	25.863	25.639	14.812	17.337	17.038
15	26.753	26.212	26.142	25.703	14.778	17.334	17.095
16	26.615	26.234	26.008	25.738	14.741	17.360	17.114
17	26.536	26.148	26.046	25.565	14.806	17.355	17.045
18	26.477	26.277	25.947	25.776	14.812	17.360	17.019
19	26.458	26.326	25.996	25.750	14.794	17.365	17.093
20	26.448	26.200	25.947	25.557	14.803	17.345	17.072
21	26.467	26.212	25.778	25.281	14.791	17.334	17.082
22	26.496	26.446	25.979	25.562	14.834	17.355	17.069
23	26.694	26.403	26.058	25.693	14.828	17.363	17.108
24	26.373	26.240	25.720	25.483	14.778	17.365	17.053
25	26.741	26.209	26.125	25.636	14.757	17.355	17.074
26	26.656	26.348	26.221	25.859	14.744	17.342	17.035
27	26.486	26.329	25.912	25.759	14.766	17.355	17.087
28	26.445	26.265	26.002	25.501	14.781	17.345	16.985
29	26.640	26.357	26.177	25.876	14.778	17.347	17.043
30	26.618	26.339	26.116	25.521	14.794	17.355	17.095
31	26.480	26.320	25.915	25.779	14.769	17.334	17.038
32	26.524	26.200	25.892	25.395	14.818	17.345	17.080

Figure D11.   (cont) Run 8, 12-01-93, ZOC #2 (Raw Data)

105

Scan	22	Port Number 23	24	25	26	27	28
1	16.546	16.518	16.283	17.621	20.908	22.446	22.752
2	16.546	16.476	16.330	17.658	20.942	22.533	22.758
3	16.544	16.515	16.356	17.671	20.963	22.524	22.781
4	16.554	16.520	16.312	17.602	20.871	22.485	22.764
5	16.507	16.463	16.338	17.650	20.850	22.474	22.796
6	16.504	16.500	16.322	17.565	20.787	22.544	22.786
7	16.517	16.492	16.371	17.658	20.908	22.455	22.766
8	16.501	16.484	16.377	17.737	20.982	22.457	22.795
9	16.507	16.531	16.389	17.544	20.960	22.466	22.761
10	16.507	16.500	16.332	17.602	20.882	22.457	22.738
11	16.501	16.494	16.345	17.892	20.819	22.471	22.735
12	16.515	16.492	16.389	17.687	20.983	22.544	22.724
13	16.541	16.494	16.398	17.568	20.924	22.491	22.769
14	16.530	16.531	16.296	17.581	20.856	22.544	22.829
15	16.541	16.489	16.369	17.621	20.874	22.416	22.789
16	16.554	16.463	16.400	17.615	20.929	22.452	22.738
17	16.499	16.458	16.351	17.711	20.942	22.527	22.769
18	16.507	16.489	16.379	17.684	20.905	22.530	22.764
19	16.467	16.507	16.358	17.671	20.913	22.480	22.758
20	16.491	16.523	16.400	17.621	20.937	22.421	22.781
21	16.515	16.479	16.332	17.571	20.859	22.400	22.772
22	16.499	16.484	16.364	17.549	20.911	22.480	22.786
23	16.565	16.513	16.371	17.589	20.795	22.424	22.766
24	16.541	16.515	16.382	17.512	20.879	22.500	22.792
25	16.472	16.461	16.382	17.700	20.984	22.482	22.778
26	16.533	16.458	16.351	17.618	20.916	22.513	22.758
27	16.501	16.526	16.351	17.555	20.916	22.466	22.758
28	16.499	16.518	16.340	17.565	20.976	22.488	22.766
29	16.475	16.494	16.377	17.813	20.921	22.510	22.724
30	16.515	16.487	16.377	17.596	20.908	22.455	22.741
31	16.493	16.448	16.319	17.555	20.982	22.469	22.764
32	16.525	16.459	16.395	17.586	20.966	22.494	22.721

Figure D11. (cont) Run 8, 12-01-93, ZOC #2 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	20.417	19.391	16.312	16.250
2	20.390	19.329	16.298	16.259
3	20.402	19.343	16.396	16.289
4	20.351	19.253	16.301	16.268
5	20.450	19.411	16.365	16.271
6	20.312	19.256	16.312	16.274
7	20.441	19.340	16.340	16.262
8	20.393	19.408	16.326	16.283
9	20.432	19.416	16.360	16.262
10	20.444	19.394	16.326	16.274
11	20.420	19.380	16.334	16.286
12	20.429	19.467	16.334	16.286
13	20.366	19.242	16.348	16.259
14	20.411	19.343	16.318	16.277
15	20.288	19.275	16.299	16.250
16	20.441	19.351	16.396	16.304
17	20.435	19.374	16.351	16.298
18	20.489	19.413	16.382	16.315
19	20.444	19.509	16.343	16.280
20	20.357	19.323	16.298	16.280
21	20.381	19.374	16.376	16.271
22	20.399	19.287	16.379	16.280
23	20.327	19.177	16.309	16.265
24	20.360	19.256	16.360	16.292
25	20.543	19.444	16.443	16.312
26	20.387	19.273	16.326	16.277
27	20.360	19.270	16.318	16.277
28	20.324	19.360	16.354	16.298
29	20.474	19.397	16.354	16.307
30	20.369	19.213	16.295	16.259
31	20.333	19.273	16.292	16.250
32	20.381	19.368	16.365	16.271

Figure D11.   (cont) Run 8, 12-01-93, ZOC #2 (Raw Data)

107

Data Print Out for Zoc # 3 , Run # 8 , FileZR3312818
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port: 10
    Length of data run (sec):   30.0606080606
    The scan type is: 1
    Number of scans/traverses: 32
    Increment of traverse: 0 Inches
    Atmospheric pressure is: 14.87 psia
    Tunnel Pressure Ratio is: .903213327632

Scan	Port Number						
	1	2	3	4	5	6	7
1	15.414	15.336	17.326	20.314	21.961	23.667	24.347
2	15.298	14.860	16.845	19.449	22.005	23.238	24.524
3	15.323	14.932	17.249	19.927	22.310	23.630	24.399
4	15.307	14.822	16.571	19.309	22.070	23.313	24.441
5	15.326	14.987	17.081	19.818	22.026	23.385	24.285
6	15.354	14.945	17.717	19.990	22.700	24.000	24.649
7	15.364	15.202	18.020	20.689	22.691	23.674	24.595
8	15.282	14.819	16.654	19.609	21.649	23.422	24.504
9	15.376	15.120	17.435	20.066	21.992	23.643	24.393
10	15.314	14.802	16.933	19.975	22.195	23.351	24.401
11	15.314	14.918	17.171	19.732	22.001	23.698	24.276
12	15.376	15.404	17.958	20.340	22.338	23.725	24.439
13	15.373	14.928	17.474	20.185	21.980	23.562	24.404
14	15.317	14.932	16.988	19.545	21.958	23.259	24.353
15	15.326	15.048	16.840	20.286	22.005	23.514	24.382
16	15.445	15.052	17.430	19.618	22.182	23.527	24.401
17	15.332	14.894	16.757	19.294	21.533	23.405	24.259
18	15.335	14.928	17.065	19.704	22.173	23.211	24.453
19	15.301	15.048	17.184	20.079	21.898	23.327	24.501
20	15.342	15.134	17.091	20.094	21.814	23.531	24.401
21	15.307	14.737	16.442	18.790	21.471	22.918	24.302
22	15.342	14.771	16.737	19.590	21.440	23.102	24.313
23	15.329	15.024	17.451	20.517	22.260	23.919	24.521
24	15.379	15.055	17.164	19.866	22.388	23.364	24.575
25	15.376	15.661	17.701	20.244	22.366	23.650	24.467
26	15.429	15.462	17.676	20.092	22.185	23.725	24.479
27	15.310	14.901	17.440	19.904	22.151	23.752	24.561
28	15.386	15.171	17.432	19.504	21.808	23.071	24.040
29	15.342	15.233	17.629	20.079	22.214	23.694	24.481
30	15.370	15.021	17.052	19.752	22.360	23.527	24.356
31	15.332	14.904	17.171	20.271	22.057	23.629	24.393
32	15.426	15.072	17.270	19.866	21.914	23.540	24.513

Figure D11. (cont) Run 8, 12-01-93, ZOC #3 (Raw Data)

Scan	Port Number 8	9	10	11	12	13	14
1	25.205	25.843	26.225	26.360	26.747	27.762	27.559
2	25.113	25.804	26.100	26.548	26.754	27.808	27.569
3	24.970	25.623	26.166	26.343	26.629	27.662	27.320
4	24.973	25.626	26.097	26.319	26.586	27.769	27.278
5	25.290	25.834	26.022	26.466	26.831	27.679	27.531
6	25.556	26.083	26.287	26.416	26.835	27.825	27.794
7	25.266	25.861	26.150	26.311	26.654	27.772	27.569
8	25.257	25.667	26.094	26.387	26.685	27.622	27.513
9	25.531	25.813	26.113	26.355	26.667	27.612	27.379
10	25.129	25.557	26.200	26.469	26.710	27.815	27.429
11	25.232	25.881	26.110	26.267	26.785	27.785	27.358
12	25.196	25.872	26.247	26.384	26.841	27.831	27.601
13	25.269	25.703	26.172	26.287	26.577	27.888	27.369
14	25.126	25.947	26.365	26.396	26.726	27.858	27.654
15	25.287	25.869	26.054	26.322	26.800	27.758	27.604
16	25.391	26.006	26.262	26.440	26.822	27.725	27.404
17	25.306	25.858	26.160	26.425	26.822	27.642	27.460
18	25.290	25.837	26.047	26.463	26.785	27.841	27.492
19	25.107	25.721	26.032	26.220	26.667	27.659	27.531
20	24.961	25.703	26.203	26.375	26.723	27.592	27.281
21	24.891	25.703	25.954	26.337	26.987	27.632	27.341
22	25.153	25.706	26.169	26.270	26.779	27.798	27.524
23	25.327	25.902	26.191	26.325	26.741	27.785	27.503
24	25.202	25.664	26.269	26.349	26.835	27.672	27.369
25	25.248	25.742	26.203	26.410	26.744	27.778	27.626
26	25.415	25.941	26.359	26.513	26.844	27.763	27.682
27	25.199	25.786	26.147	26.402	26.772	27.699	27.566
28	25.120	25.444	26.060	26.404	26.741	27.748	27.555
29	25.318	25.852	25.988	26.516	26.847	27.762	27.524
30	25.107	25.706	26.172	26.413	26.884	27.639	27.460
31	25.113	25.985	26.178	26.451	26.738	27.526	27.597
32	25.275	25.691	26.144	26.448	26.757	27.619	27.576

Figure D11. (cont) Run 8, 12-01-93, ZOC #3 (Raw Data)

Scan	Port Number						
	15	16	17	18	19	20	21
1	26.920	26.456	26.176	17.266	17.649	18.025	17.676
2	26.791	26.358	26.118	17.273	17.597	18.006	17.649
3	26.808	26.242	26.084	17.259	17.636	18.053	17.692
4	26.676	26.278	25.880	17.286	17.597	18.081	17.744
5	26.877	26.510	25.988	17.263	17.641	18.025	17.605
6	26.932	26.524	26.167	17.279	17.589	18.022	17.660
7	26.817	26.477	26.081	17.240	17.628	18.006	17.823
8	26.581	26.477	26.038	17.213	17.608	18.034	17.697
9	26.739	26.275	26.075	17.213	17.605	18.041	17.663
10	26.670	26.260	25.988	17.359	17.620	18.025	17.686
11	26.627	26.514	25.077	17.203	17.631	18.072	17.652
12	27.004	26.586	26.331	17.256	17.623	18.137	17.634
13	26.719	26.550	25.874	17.263	17.586	18.072	17.697
14	26.765	26.235	26.078	17.339	17.649	18.031	17.694
15	26.868	26.405	26.109	17.253	17.646	18.031	17.673
16	26.943	26.405	26.164	17.263	17.667	18.140	17.783
17	26.759	26.278	26.146	17.273	17.651	18.062	17.663
18	26.730	26.365	25.988	17.283	17.633	18.093	17.678
19	26.748	26.542	26.028	17.286	17.608	18.162	17.678
20	26.713	26.304	26.007	17.302	17.651	18.087	17.731
21	26.664	26.362	25.791	17.236	17.654	17.997	17.671
22	26.820	26.528	26.053	17.312	17.638	18.146	17.771
23	26.934	26.586	26.047	17.283	17.628	18.075	17.707
24	26.802	26.235	25.862	17.279	17.639	18.097	17.744
25	26.868	26.463	26.183	17.253	17.638	18.118	17.686
26	26.820	26.528	26.247	17.329	17.664	18.075	17.723
27	26.799	26.448	26.078	17.296	17.631	18.053	17.676
28	26.713	26.401	26.102	17.352	17.672	18.093	17.689
29	26.906	26.434	26.075	17.286	17.714	18.162	17.652
30	26.739	26.470	26.102	17.253	17.719	18.072	17.715
31	26.722	26.354	26.056	17.362	17.646	18.065	17.636
32	26.739	26.351	25.890	17.243	17.687	18.121	17.731

Figure D11. Run 8, 12-01-93, ZOC #3 (Raw Data)

110

Scan	Port Number 22	23	24	25	26	27	28
1	17.069	16.247	17.897	21.591	21.336	20.500	21.896
2	17.064	18.221	18.076	21.561	21.357	20.471	22.006
3	17.037	16.201	18.089	21.514	21.297	20.495	21.962
4	17.090	16.282	17.952	21.561	21.339	20.486	21.918
5	17.055	16.233	18.185	21.561	21.310	20.457	21.899
6	17.053	16.227	18.109	21.505	21.334	20.500	21.957
7	17.026	16.244	18.064	21.529	21.347	20.446	21.924
8	17.037	16.224	18.190	21.585	21.378	20.483	21.957
9	17.034	16.247	18.107	21.526	21.320	20.463	22.020
10	17.002	16.201	17.965	21.511	21.320	20.486	21.940
11	16.985	16.172	18.099	21.579	21.281	20.448	21.968
12	17.015	16.233	18.223	21.585	21.310	20.520	21.891
13	17.012	16.186	18.079	21.511	21.360	20.489	21.979
14	17.039	16.270	17.899	21.570	21.334	20.512	22.020
15	16.988	16.221	18.041	21.529	21.312	20.466	21.885
16	17.012	16.166	18.122	21.520	21.334	20.440	22.012
17	17.026	16.247	18.061	21.564	21.341	20.495	21.918
18	17.047	16.215	18.185	21.559	21.326	20.503	21.971
19	16.999	16.215	18.185	21.544	21.299	20.463	21.913
20	17.018	16.250	18.172	21.591	21.320	20.483	22.023
21	16.999	16.244	18.046	21.511	21.328	20.451	21.998
22	17.026	16.233	18.066	21.488	21.320	20.457	21.916
23	17.015	18.244	17.978	21.505	21.302	20.460	21.962
24	17.018	16.218	17.978	21.500	21.299	20.460	21.932
25	17.026	16.198	18.109	21.573	21.347	20.483	22.037
26	17.004	16.183	17.973	21.532	21.310	20.474	21.940
27	16.993	16.253	18.157	21.511	21.302	20.509	21.921
28	17.004	16.247	18.162	21.550	21.315	20.477	22.012
29	16.988	16.186	18.099	21.500	21.312	20.451	21.971
30	17.045	16.253	18.114	21.602	21.344	20.469	21.839
31	17.010	16.189	17.892	21.523	21.320	20.503	21.896
32	16.983	16.172	18.114	21.508	21.328	20.440	21.965

Figure D11. (cont) Run 8, 12-01-93, ZOC #3 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	20.561	18.571	16.846	14.805
2	20.594	18.646	16.843	14.833
3	20.610	18.684	16.884	14.822
4	20.572	18.582	16.843	14.816
5	20.584	18.614	16.901	14.861
6	20.673	18.748	16.898	14.830
7	20.594	18.632	16.828	14.830
8	20.605	18.684	16.851	14.816
9	20.613	18.751	16.904	14.816
10	20.616	18.661	16.825	14.841
11	20.569	18.748	16.805	14.816
12	20.511	18.687	16.822	14.813
13	20.561	18.838	16.896	14.833
14	20.616	18.675	16.810	14.819
15	20.520	18.612	16.802	14.827
16	20.621	18.661	16.945	14.824
17	20.591	18.603	16.854	14.822
18	20.605	18.707	16.893	14.827
19	20.575	18.696	16.849	14.838
20	20.662	18.757	16.854	14.836
21	20.503	18.652	16.895	14.810
22	20.599	18.620	16.884	14.824
23	20.624	18.693	16.913	14.810
24	20.597	18.635	16.875	14.813
25	20.662	18.794	16.919	14.819
26	20.531	18.617	16.819	14.844
27	20.479	18.553	16.822	14.838
28	20.660	18.719	16.919	14.836
29	20.621	18.687	16.860	14.836
30	20.503	18.548	16.843	14.824
31	20.514	18.594	16.872	14.838
32	20.553	18.582	16.863	14.833

Figure D11. (cont) Run 8, 12-01-93, ZOC #3 (Raw Data)

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Data Print Out for Zoc # 1 , Run # 3 , File:ZP1312063
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port: 10
    Length of data run (sec): 31
    The scan type is: 3
    Number of scans/traverses: 33
    Increment of traverse: .0625  Inches
    Atmospheric pressure is: 14.78  psia
    Tunnel Pressure Ratio is: 2.01293840025
```

Scan	Port Number 1	2	3	4	5	6	7
1	15.193	15.079	18.484	21.312	22.470	23.135	23.679
2	15.274	15.014	19.311	21.624	22.525	23.237	24.077
3	15.202	15.060	19.366	21.578	22.617	23.218	23.735
4	15.211	15.116	18.787	21.542	22.644	23.237	23.679
5	15.211	15.069	18.383	20.880	22.388	23.228	23.892
6	15.184	15.042	18.760	21.661	22.855	23.488	24.059
7	15.265	15.060	18.677	21.119	22.388	23.737	24.124
8	15.238	15.042	18.907	21.394	22.360	23.265	24.096
9	15.220	15.014	18.272	21.312	22.718	23.228	23.874
10	15.229	15.079	18.355	21.330	22.479	23.404	24.031
11	15.238	15.023	18.521	21.082	22.507	23.162	24.003
12	15.220	15.107	18.171	21.018	22.324	23.200	23.938
13	15.265	15.069	19.109	21.091	22.259	23.069	24.031
14	15.229	15.042	18.557	21.119	22.369	23.032	23.827
15	15.247	15.134	18.107	20.953	22.039	23.190	23.809
16	15.265	15.107	18.309	21.339	22.580	23.228	23.762
17	15.256	15.107	18.227	21.119	22.470	23.367	23.976
18	15.229	15.079	18.364	21.156	22.580	23.404	24.161
19	15.229	15.088	18.475	21.073	22.269	23.283	24.013
20	15.211	15.069	18.144	20.972	22.333	22.986	23.892
21	15.238	15.014	19.247	21.468	22.553	23.228	23.920
22	15.265	15.069	18.815	21.183	22.379	22.921	23.818
23	15.265	15.069	18.851	21.211	22.433	23.255	24.096
24	15.211	14.995	18.824	20.953	22.085	23.135	23.946
25	15.265	15.060	19.192	21.312	22.406	23.274	23.929
26	15.265	15.069	18.502	21.036	22.479	23.181	23.874
27	15.265	15.097	18.429	20.944	22.149	22.865	23.670
28	15.247	15.042	18.502	20.935	22.314	23.116	23.901
29	15.238	15.088	18.199	20.981	22.452	23.404	24.161
30	15.211	15.088	18.539	21.247	22.571	23.125	23.800
31	15.238	15.097	18.787	21.064	22.433	23.371	23.966
32	15.229	15.079	18.971	21.395	22.388	23.172	24.059
33	15.247	15.088	18.658	21.293	22.406	23.023	23.901

Figure D12. Run 3, 12-06-93, ZOC #1 (Raw Data)

113

Scan	8	Port Number 9	10	11	12	13	14
1	24.448	25.099	25.597	25.895	29.858	27.138	27.305
2	24.575	25.233	25.792	26.092	29.867	27.058	27.288
3	24.439	25.162	25.721	26.163	29.858	27.156	27.365
4	24.530	25.055	25.508	26.029	29.967	27.031	27.279
5	24.393	24.957	25.775	26.145	29.867	27.022	27.417
6	24.484	24.957	25.525	26.154	29.875	27.228	27.391
7	24.802	25.251	25.828	26.243	29.875	27.076	27.271
8	24.648	25.224	25.436	25.814	29.849	27.120	27.288
9	24.539	25.019	25.508	26.118	29.893	26.969	27.185
10	24.557	25.215	25.766	26.181	29.831	27.058	27.314
11	24.602	25.117	25.623	26.011	29.858	27.093	27.348
12	24.393	24.894	25.623	26.074	29.849	27.093	27.460
13	24.684	25.411	25.775	26.047	29.831	27.067	27.279
14	24.466	25.099	25.570	26.199	28.867	27.058	27.288
15	24.612	25.331	25.801	26.136	29.849	27.201	27.383
16	24.339	25.046	25.730	26.029	29.858	27.058	27.288
17	24.484	25.171	25.768	26.127	29.840	27.183	27.365
18	24.530	25.215	25.703	26.217	29.831	26.995	27.176
19	24.802	25.099	25.481	25.966	29.858	27.013	27.236
20	24.393	24.966	25.499	26.020	29.867	27.013	27.279
21	24.484	25.081	25.534	25.859	29.831	27.004	27.296
22	24.602	25.331	25.703	26.172	29.849	27.076	27.253
23	24.611	25.099	25.659	26.208	29.858	27.076	27.167
24	24.430	25.126	25.650	25.957	29.804	27.183	27.494
25	24.521	25.099	25.561	25.895	29.849	26.869	27.228
26	24.484	25.197	25.828	26.127	29.849	27.058	27.279
27	24.366	25.117	25.481	25.948	29.931	27.058	27.228
28	24.411	25.028	25.632	26.083	29.849	27.111	27.245
29	24.675	25.153	25.659	26.056	29.840	27.076	27.374
30	24.439	25.001	25.552	25.975	29.813	26.977	27.116
31	24.493	25.028	25.659	26.145	29.822	26.968	27.159
32	24.757	25.233	25.490	26.074	29.822	27.372	27.417
33	24.666	25.251	25.579	26.163	29.831	27.129	27.202

Figure D12.   (cont) Run 3, 12-06-93, ZOC #1 (Raw Data)

114

Scan	Port Number						
	15	16	17	18	19	20	21
1	27.491	27.563	27.665	27.694	27.814	27.845	27.922
2	27.429	27.510	27.545	27.547	27.662	27.757	27.931
3	27.562	27.686	27.717	27.686	27.940	27.854	27.819
4	27.508	27.474	27.545	27.504	27.721	27.748	27.802
5	27.632	27.686	27.683	27.720	27.814	27.801	27.742
6	27.473	27.563	27.580	27.556	27.738	27.819	27.862
7	27.393	27.492	27.494	27.504	27.721	27.901	27.854
8	27.562	27.527	27.537	27.504	27.788	27.784	27.811
9	27.296	27.430	27.571	27.547	27.788	27.845	27.828
10	27.438	27.571	27.571	27.478	27.729	27.713	27.819
11	27.526	27.607	27.571	27.694	27.704	27.784	27.768
12	27.526	27.571	27.588	27.686	27.788	27.775	27.828
13	27.491	27.536	27.631	27.642	27.872	27.801	27.957
14	27.446	27.607	27.563	27.582	27.687	27.722	27.785
15	27.491	27.677	27.700	27.516	27.763	27.828	27.811
16	27.429	27.545	27.503	27.486	27.729	27.784	27.734
17	27.482	27.580	27.657	27.686	27.788	27.792	27.785
18	27.358	27.519	27.623	27.625	27.738	27.731	27.897
19	27.438	27.501	27.477	27.556	27.763	27.801	27.682
20	27.305	27.483	27.537	27.573	27.721	27.775	27.768
21	27.491	27.571	27.494	27.642	27.881	27.819	27.854
22	27.491	27.642	27.494	27.512	27.713	27.731	27.751
23	27.207	27.430	27.605	27.564	27.704	27.757	27.811
24	27.624	27.833	27.657	27.530	27.721	27.889	27.897
25	27.367	27.527	27.665	27.781	27.906	27.960	27.957
26	27.340	27.457	27.468	27.469	27.839	27.925	27.871
27	27.349	27.563	27.511	27.547	27.738	27.810	27.785
28	27.420	27.607	27.674	27.712	27.780	27.907	27.948
29	27.508	27.527	27.503	27.564	27.704	27.669	27.768
30	27.358	27.580	27.554	27.521	27.704	27.810	27.854
31	27.340	27.483	27.588	27.547	27.780	27.775	27.957
32	27.269	27.360	27.520	27.573	27.771	27.863	27.811
33	27.269	27.563	27.545	27.642	27.780	27.854	27.802

Figure D12. (cont) Run 3, 12-06-93, ZOC #1 (Raw Data)

Scan	Port Number						
	22	23	24	25	26	27	28
1	27.884	28.526	29.845	31.412	24.377	19.054	24.674
2	27.858	28.481	30.000	31.488	24.437	19.104	24.649
3	27.823	28.508	29.802	31.429	24.173	18.944	24.455
4	27.928	28.543	29.879	31.395	24.471	19.163	24.607
5	27.797	28.420	29.793	31.420	24.309	19.096	24.598
6	27.928	28.552	29.836	31.344	24.241	18.986	24.767
7	27.814	28.455	29.923	31.403	24.377	19.087	24.590
8	27.920	28.543	29.906	31.420	24.403	19.130	24.582
9	27.867	28.526	29.784	31.386	24.420	19.113	24.472
10	27.911	28.446	29.802	31.437	24.326	19.113	24.446
11	27.955	28.552	29.879	31.420	24.343	19.062	24.649
12	27.981	28.587	29.810	31.454	24.300	19.054	24.311
13	27.937	28.552	29.879	31.471	24.377	19.104	24.582
14	27.849	28.464	29.828	31.353	24.275	19.037	24.548
15	27.867	28.437	29.836	31.437	24.420	19.138	24.565
16	27.744	28.349	29.784	31.327	24.207	19.037	24.522
17	27.911	28.411	29.810	31.389	24.241	19.012	24.522
18	27.928	28.508	29.750	31.378	24.249	19.071	24.472
19	27.832	28.446	29.853	31.389	24.360	19.104	24.506
20	27.841	28.437	29.776	31.299	24.292	18.970	24.463
21	27.841	28.473	29.914	31.505	24.360	19.121	24.514
22	27.841	28.428	29.810	31.463	24.215	19.079	24.598
23	27.849	28.517	29.879	31.370	24.139	18.944	24.489
24	27.761	28.517	29.974	31.389	24.300	19.045	24.489
25	28.025	28.543	29.931	31.403	24.317	19.012	24.691
26	27.867	28.473	29.888	31.437	24.317	19.037	24.691
27	27.647	28.428	29.758	31.386	24.362	19.096	24.548
28	27.928	28.578	29.828	31.403	24.411	19.096	24.522
29	27.753	28.420	29.845	31.353	24.275	19.012	24.522
30	27.884	28.420	29.776	31.336	24.232	19.029	24.413
31	27.893	28.437	29.862	31.310	24.437	19.087	24.615
32	27.770	28.437	29.845	31.388	24.336	19.130	24.506
33	27.823	28.411	29.802	31.338	24.388	19.062	24.514

Figure D12. Run 3, 12-06-93, ZOC #1 (Raw Data)

116

Scan	Port Number			
	29	30	31	32
1	15.392	30.983	48.206	46.436
2	15.434	31.026	48.137	46.197
3	15.442	31.069	48.274	45.808
4	15.426	30.983	48.240	45.625
5	15.426	30.949	48.206	45.507
6	15.501	31.026	48.214	45.542
7	15.459	31.069	48.282	45.569
8	15.409	30.975	48.265	45.401
9	15.409	30.983	48.197	45.294
10	15.426	30.983	48.265	45.339
11	15.451	30.975	48.248	45.294
12	15.442	31.009	48.333	45.463
13	15.434	30.932	48.146	45.020
14	15.426	30.966	48.171	42.743
15	15.451	30.975	48.342	39.826
16	15.451	30.957	48.146	37.553
17	15.451	30.914	48.282	40.881
18	15.476	30.975	48.308	45.294
19	15.375	30.932	48.154	46.011
20	15.367	30.906	48.078	45.879
21	15.442	30.983	48.231	45.932
22	15.392	30.940	48.163	45.799
23	15.468	30.906	48.257	45.737
24	15.434	30.914	48.367	45.755
25	15.451	30.932	48.257	45.702
26	15.501	30.957	48.325	45.666
27	15.434	30.906	48.257	45.631
28	15.426	30.923	48.333	45.586
29	15.426	30.914	48.274	45.668
30	15.409	30.880	48.240	45.595
31	15.409	30.854	48.197	45.631
32	15.409	30.854	48.146	45.675
33	15.409	30.794	48.240	45.631

Figure D12. (cont) Run 3, 12-06-93, ZOC #1 (Raw Data)
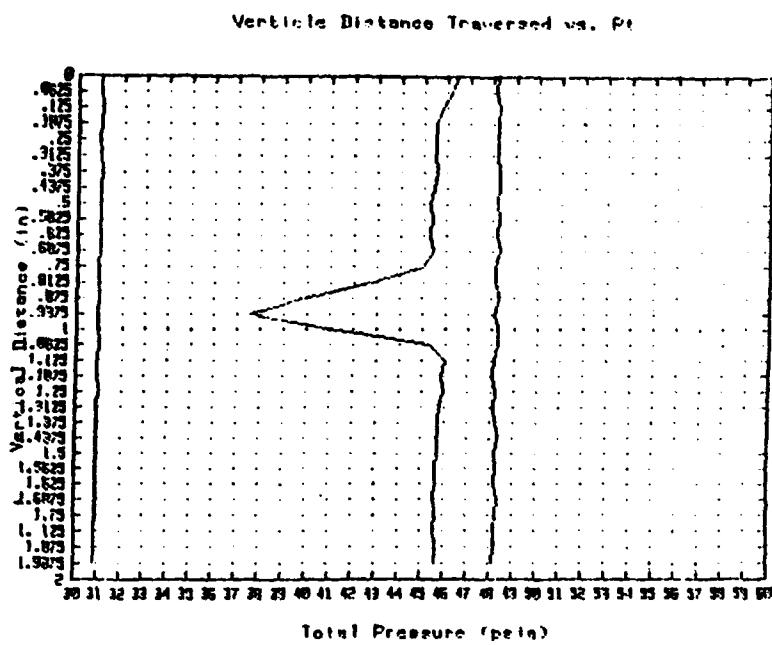
Vertirle Distance Traversed vs. Pt

The cascade loss coefficient based on inlet
dynamic pressure as calculated using
mass averaged quantities as shown below.

Ptma1 = 48.2358157816 PSIA
Ptma2 = 45.1421902158 PSIA

Pt1-P1 = 32.8037489344 PSIA
Ttavg = 507.5 deg R

W_bar = .0943070736203

Figure D12. (cont) Run 3, 12-06-93, ZOC #1 (Impact Prove Survey)

```
Data Print Out for Zoc # 2 , Run # 3 , File2R2312063
    Period between samples (sec): .0030303030303
    Sample collection rate (Hz): 330
    Number of samples per port:   10
    Length of data run (sec):     31
    The scan type is:             3
    Number of scans/traverses:    33
    Increment of traverse:        .0625   Inches
    Atmospheric pressure is:      14.76  psia
    Tunnel Pressure Ratio is:     .9900222065557
```

Scan			Port Number				
	1	2	3	4	5	6	7
1	27.930	28.465	28.354	28.703	28.531	28.549	28.466
2	27.860	28.555	28.481	28.716	28.637	28.658	28.550
3	28.017	28.656	28.530	28.765	28.686	28.703	28.498
4	28.028	28.465	28.499	28.732	28.633	28.623	28.479
5	27.901	28.483	28.366	28.683	28.581	28.604	28.453
6	27.949	28.441	28.467	28.820	28.669	28.661	28.527
7	27.865	28.501	28.438	28.716	28.587	28.735	28.582
8	27.917	28.418	28.444	28.657	28.627	28.626	28.492
9	27.865	28.457	28.487	28.660	28.587	28.588	28.588
10	27.939	28.421	28.429	28.745	28.607	28.623	28.508
11	27.838	28.509	28.400	28.683	28.597	28.585	28.579
12	27.819	28.364	28.383	28.752	28.551	28.543	28.399
13	27.971	28.552	28.383	28.677	28.554	28.613	28.485
14	27.895	28.472	28.308	28.693	28.574	28.601	28.530
15	27.922	28.483	28.415	28.732	28.518	28.645	28.527
16	27.911	28.493	28.371	28.815	28.551	28.537	28.421
17	27.998	28.555	28.447	28.680	28.584	28.687	28.543
18	27.925	28.534	28.415	28.703	28.564	28.671	28.518
19	27.871	28.501	28.383	28.716	28.543	28.620	28.556
20	27.833	28.416	28.374	28.690	28.495	28.559	28.415
21	28.015	28.645	28.539	28.765	28.554	28.623	28.508
22	28.072	28.527	28.502	28.748	28.663	28.591	28.463
23	27.955	28.506	28.435	28.634	28.614	28.674	28.505
24	27.996	28.444	28.354	28.670	28.623	28.604	28.518
25	27.947	28.480	28.476	28.690	28.558	28.671	28.492
26	27.846	28.457	28.397	28.703	28.591	28.617	28.415
27	27.841	28.356	28.290	28.589	28.459	28.482	28.437
28	27.860	28.511	28.334	28.631	28.564	28.736	28.495
29	27.892	28.470	28.449	28.745	28.627	28.649	28.518
30	27.955	28.599	28.510	28.605	28.545	28.575	28.392
31	27.920	28.534	28.429	28.618	28.515	28.521	28.389
32	27.887	28.426	28.400	28.621	28.521	28.565	28.431
33	27.819	28.483	28.331	28.664	28.548	28.581	28.466

Figure D12.   (cont) Run 3, 12-06-93, ZOC #2 (Raw Data)

119

Scan	Port Number						
	8	9	10	11	12	13	14
1	28.632	28.378	28.364	29.130	28.905	28.878	27.615
2	28.655	28.431	28.458	29.191	29.041	28.970	27.716
3	28.594	28.428	28.504	29.202	29.077	28.987	27.772
4	28.575	28.459	28.494	29.103	29.086	28.971	27.700
5	28.585	28.384	28.435	29.122	28.912	28.866	27.759
6	28.607	28.422	28.386	29.205	29.064	29.000	27.692
7	28.636	28.522	28.491	29.211	29.097	28.962	27.723
8	28.658	28.456	28.413	29.003	28.914	28.919	27.654
9	28.537	28.362	28.383	29.155	29.087	28.843	27.700
10	28.639	28.450	28.507	29.230	29.019	28.886	27.700
11	28.651	28.400	28.468	29.194	29.082	28.937	27.659
12	28.483	28.478	28.416	29.114	29.054	28.876	27.775
13	28.728	28.490	28.468	29.249	28.893	28.949	27.692
14	28.540	28.447	28.439	29.180	29.031	28.932	27.677
15	28.661	28.450	28.481	29.045	29.039	28.977	27.708
16	28.553	28.325	28.354	29.169	28.950	28.886	27.626
17	28.537	28.534	28.533	29.177	28.940	28.929	27.759
18	28.626	28.403	28.484	29.233	29.064	28.960	27.677
19	28.604	28.425	28.409	29.070	28.879	28.853	27.618
20	28.563	28.334	28.487	28.973	29.013	28.873	27.608
21	28.645	28.493	28.448	29.094	28.909	28.861	27.646
22	28.642	28.434	28.452	29.249	29.016	28.906	27.677
23	28.493	28.468	28.432	29.186	28.983	28.972	27.654
24	28.591	28.309	28.373	29.091	29.019	28.970	27.716
25	28.655	28.478	28.468	29.006	28.950	28.914	27.636
26	28.628	28.478	28.452	29.122	28.935	28.957	27.690
27	28.531	28.341	28.377	29.150	28.993	28.904	27.615
28	28.579	28.362	28.432	29.186	28.988	28.947	27.710
29	28.651	28.434	28.409	29.144	29.082	28.949	27.695
30	28.480	28.366	28.403	28.946	28.863	28.868	27.597
31	28.528	28.319	28.360	29.268	28.909	28.790	27.533
32	28.658	28.381	28.367	29.188	29.039	29.003	27.726
33	28.617	28.428	28.445	29.083	28.952	28.944	27.551

Figure D12. (cont) Run 3, 12-06-93, ZOC #2 (Raw Data)

Scan	Port Number						
	15	16	17	18	19	20	21
1	28.520	28.461	28.308	27.897	29.727	29.719	22.913
2	28.488	28.378	28.115	27.814	29.724	29.717	22.897
3	28.504	28.492	28.364	27.902	29.727	29.719	22.913
4	28.507	28.331	28.115	27.796	29.715	29.709	22.947
5	28.526	28.504	28.238	27.949	29.724	29.712	22.884
6	28.416	28.399	28.229	27.849	29.715	29.709	22.871
7	28.459	28.443	28.108	27.799	29.718	29.717	22.981
8	28.447	28.443	28.247	27.784	29.718	29.712	22.905
9	28.418	28.285	28.109	27.858	29.724	29.709	22.952
10	28.494	28.477	28.133	27.760	29.702	29.719	22.923
11	28.456	28.483	28.162	27.932	29.705	29.706	22.989
12	28.535	28.430	28.223	27.902	29.702	29.709	22.863
13	28.488	28.347	29.295	27.849	29.705	29.712	22.960
14	28.453	28.384	28.194	27.855	29.705	29.714	22.923
15	28.510	28.486	28.267	27.964	29.712	29.709	22.973
16	28.421	28.353	28.174	27.740	29.705	29.709	22.869
17	28.488	28.427	28.252	27.899	29.721	29.701	22.879
18	28.507	28.384	28.223	27.973	29.718	29.706	22.802
19	28.482	28.381	28.153	27.814	29.699	29.704	22.847
20	28.386	28.350	28.138	27.825	29.693	29.706	22.944
21	28.488	28.424	28.135	27.929	29.705	29.704	22.918
22	28.415	28.424	28.185	27.858	29.681	29.693	22.779
23	28.377	28.424	28.255	27.743	29.702	29.693	22.850
24	28.494	28.461	28.258	27.822	29.684	29.704	22.973
25	28.393	28.427	28.247	28.012	29.693	29.696	22.921
26	28.367	28.406	28.130	27.722	29.684	29.688	22.947
27	28.301	28.421	28.171	27.837	29.699	29.704	22.947
28	29.478	28.467	28.229	27.947	29.699	29.696	22.937
29	28.507	28.412	28.253	27.793	29.696	29.691	22.800
30	28.424	28.399	28.121	27.716	29.687	29.688	22.984
31	28.326	28.319	28.188	27.746	29.690	29.693	23.021
32	28.386	28.356	28.185	27.808	29.699	29.693	22.968
33	28.342	28.338	28.176	27.822	29.690	29.691	23.018

Figure D12. (cont) Run 3, 12-06-93, ZOC #2 (Raw Data)

121

Scan	Port Number						
	22	23	24	25	26	27	28
1	24.837	26.616	27.731	28.093	28.114	27.809	27.515
2	24.627	26.446	27.692	28.112	28.119	27.837	27.558
3	24.622	26.407	27.614	28.058	28.111	27.829	27.526
4	24.681	26.483	27.690	28.080	28.069	27.815	27.480
5	24.630	26.540	27.661	28.045	28.093	27.823	27.512
6	24.654	26.391	27.643	28.098	28.069	27.937	27.515
7	24.755	26.451	27.705	28.101	28.154	27.876	27.563
8	24.765	26.532	27.671	28.056	28.124	27.831	27.497
9	24.683	26.579	27.755	28.117	28.095	27.829	27.503
10	24.686	26.451	27.601	28.069	28.124	27.871	27.546
11	24.712	26.522	27.687	28.096	28.117	27.831	27.549
12	24.622	26.501	27.687	28.061	28.117	27.854	27.558
13	24.752	26.530	27.731	28.093	28.109	27.862	27.543
14	24.659	26.384	27.656	28.080	28.127	27.848	27.517
15	24.808	26.605	27.726	28.106	28.122	27.865	27.560
16	24.638	26.407	27.624	28.037	28.061	27.775	27.480
17	24.675	26.389	27.538	28.053	28.101	27.826	27.549
18	24.566	26.467	27.619	28.064	28.119	27.862	27.538
19	24.593	26.378	27.593	28.074	28.122	27.859	27.517
20	24.795	26.590	27.692	28.053	28.058	27.795	27.463
21	24.651	26.511	27.726	28.101	28.119	27.876	27.583
22	24.728	26.441	27.569	28.082	28.103	27.862	27.546
23	24.641	26.389	27.700	28.104	28.114	27.820	27.543
24	24.739	26.585	27.771	28.096	28.069	27.820	27.483
25	24.821	26.648	27.718	28.125	28.164	27.896	27.555
26	24.829	26.545	27.731	28.122	28.140	27.893	27.540
27	24.832	26.525	27.671	28.032	28.071	27.795	27.532
28	24.771	26.587	27.742	28.122	28.114	27.857	27.523
29	24.577	26.337	27.601	28.029	28.077	27.848	27.517
30	24.734	26.465	27.601	28.029	28.066	27.803	27.489
31	24.866	26.629	27.744	28.101	28.090	27.820	27.497
32	24.779	26.551	27.760	28.069	28.114	27.845	27.506
33	24.742	26.493	27.679	28.058	28.101	27.812	27.500

Figure D12. (cont) Run 3, 12-06-93, ZOC #2 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	28.630	28.344	27.590	27.362
2	28.654	28.378	27.534	27.347
3	28.654	28.358	27.498	27.302
4	28.618	28.302	27.557	27.311
5	28.627	28.355	27.529	27.272
6	28.669	28.361	27.551	27.317
7	28.663	28.389	27.593	27.377
8	28.645	28.347	27.621	27.371
9	28.675	28.338	27.456	27.302
10	28.690	28.344	27.568	27.314
11	28.639	28.353	27.548	27.347
12	28.675	28.395	27.585	27.341
13	28.839	28.321	27.529	27.335
14	28.633	28.344	27.540	27.362
15	28.717	28.379	27.607	27.383
16	28.618	28.310	27.540	27.308
17	28.705	28.381	27.573	27.356
18	28.708	28.370	27.554	27.344
19	28.636	28.341	27.615	27.347
20	28.606	28.287	27.537	27.341
21	28.672	28.370	27.604	27.338
22	28.627	28.316	27.629	27.377
23	28.663	28.324	27.565	27.311
24	28.675	28.364	27.638	27.335
25	28.651	28.370	27.618	27.368
26	28.699	28.401	27.621	27.374
27	28.615	28.319	27.498	27.278
28	28.645	28.319	27.579	27.383
29	28.642	28.341	27.543	27.347
30	28.654	28.344	27.579	27.317
31	28.660	28.336	27.599	27.332
32	28.651	28.313	27.587	27.311
33	28.639	28.327	27.557	27.311

Figure D12. (cont) Run 3, 12-06-93, ZOC #2 (Raw Data)

Data Print Out for Zoc # 3 , Run # 3 , FileZR3312063
     Period between samples (sec): .0030303030303
     Sample collection rate (Hz): 330
     Number of samples per port: 10
     Length of data run (sec): 31
     The scan type is: 3
     Number of scans/traverses: 33
     Increment of traverse: .0625 Inches
     Atmospheric pressure is: 14.76 psia
     Tunnel Pressure Ratio is: .993714922932

Scan	1	Port Number 2	3	4	5	6	7
1	22.711	24.128	25.363	26.285	26.770	27.304	27.331
2	22.730	24.228	25.484	26.432	27.059	27.304	27.459
3	22.755	24.252	25.523	26.470	27.134	27.325	27.371
4	22.692	24.210	25.384	26.412	27.115	27.373	27.396
5	22.583	24.145	25.373	26.313	26.903	27.246	27.416
6	22.667	24.039	25.422	26.528	27.103	27.270	27.518
7	22.655	24.118	25.288	26.239	26.981	27.284	27.620
8	22.542	24.245	25.366	26.303	26.984	27.270	27.549
9	22.599	24.156	25.394	26.437	27.028	27.174	27.399
10	22.758	24.228	25.497	26.310	26.835	27.356	27.523
11	22.686	24.293	25.399	26.295	26.978	27.270	27.603
12	22.590	24.008	25.453	26.391	26.798	27.212	27.442
13	22.758	24.200	25.492	26.308	26.950	27.284	27.543
14	22.636	24.210	25.451	26.308	26.934	27.192	27.459
15	22.677	24.207	25.446	26.315	26.897	27.301	27.326
16	22.570	24.258	25.394	26.391	27.068	27.130	27.408
17	22.602	24.152	25.358	26.434	27.019	27.318	27.529
18	22.617	24.142	25.314	26.439	26.916	27.359	27.580
19	22.677	24.358	25.430	26.422	26.972	27.263	27.484
20	22.561	24.159	25.198	26.272	26.972	27.267	27.436
21	22.764	24.204	25.355	26.351	27.037	27.359	27.526
22	22.855	24.320	25.404	26.318	27.006	27.229	27.507
23	22.746	24.210	25.461	26.247	26.969	27.229	27.543
24	22.617	24.080	25.427	26.148	26.854	27.239	27.413
25	22.736	24.115	25.484	26.353	27.022	27.260	27.504
26	22.526	24.265	25.458	26.371	26.947	27.260	27.464
27	22.548	24.152	25.554	26.404	26.910	27.246	27.419
28	22.658	24.101	25.505	26.221	27.025	27.257	27.481
29	22.577	24.101	25.347	26.412	26.938	27.236	27.512
30	22.523	24.060	25.409	26.265	26.801	27.170	27.320
31	22.727	24.180	25.438	26.396	27.056	27.349	27.396
32	22.727	24.375	25.404	26.325	26.928	27.274	27.529
33	22.636	24.385	25.446	26.381	26.975	27.253	27.430

Figure D12.   (cont) Run 3, 12-06-93, ZOC #3 (Raw Data)

124

Scan	8	Port Number 9	10	11	12	13	14
1	27.578	27.751	27.754	27.720	27.893	29.183	28.820
2	27.655	27.849	27.883	27.913	27.959	29.183	28.855
3	27.689	27.772	27.845	27.884	27.862	29.222	28.912
4	27.747	27.802	27.748	27.834	27.831	29.183	28.795
5	27.569	27.642	27.770	27.840	27.779	29.213	28.859
6	27.603	27.799	27.845	27.922	27.862	29.166	28.922
7	27.796	27.843	27.886	27.974	27.931	29.213	28.838
8	27.704	27.819	27.720	27.782	27.757	29.209	28.813
9	27.664	27.746	27.659	27.849	27.828	29.173	28.834
10	27.676	27.849	27.858	27.872	27.822	29.173	28.905
11	27.649	27.742	27.842	27.846	27.828	29.213	28.831
12	27.670	27.731	27.739	27.820	27.884	29.206	28.866
13	27.701	27.905	27.786	27.811	27.918	29.176	28.845
14	27.615	27.748	27.714	27.813	27.884	29.196	28.883
15	27.692	27.852	27.876	27.858	27.931	29.309	28.947
16	27.569	27.728	27.748	27.691	27.813	29.000	28.802
17	27.722	27.858	27.845	27.901	27.872	29.229	28.883
18	27.692	27.881	27.786	27.852	27.937	29.116	28.891
19	27.725	27.790	27.745	27.785	27.866	29.183	28.809
20	27.554	27.725	27.811	27.834	27.800	29.113	28.873
21	27.630	27.843	27.829	27.764	27.816	29.183	28.809
22	27.655	27.861	27.770	27.837	27.890	29.236	29.954
23	27.692	27.849	27.736	27.939	27.875	29.153	28.883
24	27.538	27.716	27.786	27.779	27.866	29.236	28.908
25	27.713	27.810	27.758	27.837	27.825	29.143	28.831
26	27.689	27.772	27.961	27.892	27.921	29.209	28.933
27	27.581	27.751	27.655	27.726	27.766	29.183	28.834
28	27.569	27.763	27.845	27.753	27.903	29.196	28.852
29	27.652	27.796	27.826	27.802	27.859	29.193	28.771
30	27.609	27.668	27.764	27.776	27.800	29.100	28.686
31	27.639	27.766	27.704	27.878	27.745	29.226	29.802
32	27.759	27.819	27.708	27.811	27.931	29.299	28.859
33	27.670	27.881	27.851	27.796	27.853	29.136	28.862

Figure D12. (cont) Run 3, 12-06-93, ZOC #3 (Raw Data)

| Scan | Port Number | | | | | | |
	15	16	17	18	19	20	21
1	28.486	28.324	28.030	20.335	23.355	25.078	26.400
2	28.589	28.338	28.005	20.252	23.337	25.044	26.332
3	28.538	28.414	28.116	20.467	23.381	25.115	26.374
4	28.498	28.313	28.082	20.375	23.373	25.019	26.418
5	28.506	28.313	28.082	20.415	23.313	25.050	26.387
6	28.569	28.356	28.036	20.414	23.378	25.006	26.337
7	28.498	28.327	28.039	20.156	23.365	25.112	26.410
8	28.578	28.345	28.051	20.232	23.308	25.050	26.379
9	28.406	28.266	27.959	20.236	23.363	25.050	26.397
10	28.541	28.345	28.011	20.213	23.391	25.065	26.387
11	28.486	28.400	28.002	20.381	23.381	25.074	26.374
12	28.526	28.374	28.100	20.309	23.397	25.037	26.355
13	28.483	28.302	28.119	20.242	23.293	25.047	26.429
14	28.569	28.433	29.106	20.395	23.363	25.065	26.360
15	28.581	28.414	28.106	20.514	23.404	25.174	26.429
16	28.412	28.287	28.014	20.295	23.381	25.081	26.374
17	28.538	28.393	28.085	20.378	23.404	25.065	26.379
18	28.449	28.324	28.048	20.309	23.304	25.031	26.329
19	28.472	28.316	27.950	20.272	23.355	25.059	26.387
20	28.529	28.342	28.030	20.292	23.360	25.010	26.368
21	28.604	28.353	27.987	20.272	23.342	25.121	26.423
22	28.492	28.360	27.953	20.289	23.352	25.040	26.368
23	28.495	28.222	28.030	20.424	23.394	25.016	26.366
24	28.495	28.349	28.066	20.371	23.446	25.022	26.397
25	28.503	28.327	28.048	20.163	23.295	25.022	28.405
26	28.532	28.360	27.903	20.252	23.389	25.025	26.402
27	28.423	28.324	27.928	20.166	23.358	25.164	26.402
28	28.541	28.356	28.113	20.355	23.425	25.155	26.452
29	28.535	28.276	27.990	20.411	23.365	25.062	26.347
30	28.435	28.247	27.993	20.186	23.402	25.040	26.381
31	28.541	28.313	28.008	20.544	23.412	25.078	26.423
32	28.443	28.298	27.990	20.501	23.412	25.115	26.413
33	28.403	28.269	28.011	20.206	23.417	25.155	26.455

Figure D12. (cont) Run 3, 12-06-93, ZOC #3 (Raw Data)

126

Scan	Port Number						
	22	23	24	25	26	27	28
1	27.057	27.245	26.783	26.633	26.112	25.374	28.190
2	27.068	27.222	26.798	26.639	26.135	25.388	28.253
3	27.044	27.219	26.781	26.633	26.127	25.403	28.237
4	27.046	27.222	26.780	26.625	26.075	25.377	28.231
5	27.025	27.202	26.735	26.633	26.112	25.391	28.206
6	27.011	27.225	26.755	26.645	26.104	25.371	28.231
7	27.054	27.219	26.791	26.666	26.151	25.420	28.261
8	27.060	27.202	26.783	26.613	26.093	25.409	28.198
9	27.038	27.248	26.766	26.618	26.090	25.368	28.217
10	27.054	27.248	26.798	26.622	26.112	25.409	28.220
11	27.076	27.242	26.783	26.642	26.133	25.400	28.261
12	27.033	27.214	26.814	26.657	26.114	25.394	28.253
13	27.084	27.237	26.798	26.645	26.125	25.417	28.248
14	27.060	27.179	26.760	26.616	26.135	25.409	28.217
15	27.095	27.269	26.778	26.613	26.130	25.420	28.270
16	27.044	27.199	26.793	26.592	26.061	25.331	28.193
17	27.057	27.237	26.786	26.860	26.104	25.403	28.278
18	27.068	27.225	26.793	26.666	26.117	25.443	28.259
19	27.052	27.214	26.773	26.622	26.104	25.409	28.261
20	27.054	27.205	26.773	26.586	26.075	25.365	28.209
21	27.079	27.260	26.806	26.672	26.127	25.411	28.282
22	27.098	27.208	26.773	26.633	26.088	25.411	28.195
23	27.068	27.254	26.809	26.636	26.104	25.383	28.267
24	27.095	27.245	26.801	26.633	26.083	25.391	28.228
25	27.060	27.242	26.811	26.863	26.143	25.432	28.259
26	27.087	27.289	26.824	26.677	26.141	25.469	28.231
27	27.062	27.242	26.814	26.660	26.051	25.391	28.239
28	27.108	27.286	26.803	26.642	26.112	25.414	28.237
29	27.030	27.208	26.738	26.616	26.080	25.403	28.242
30	27.011	27.216	26.750	26.601	26.064	25.371	28.184
31	27.049	27.248	26.798	26.613	26.088	25.371	28.228
32	27.076	27.245	26.808	26.839	26.096	25.388	28.278
33	27.038	27.231	26.786	26.627	26.067	25.391	28.206

Figure D12. (cont) Run 3, 12-06-93, ZOC #3 (Raw Data)

Scan	Port Number			
	29	30	31	32
1	27.871	27.696	27.435	29.703
2	27.934	27.719	27.427	29.677
3	27.863	27.679	27.389	29.705
4	27.871	27.667	27.398	29.728
5	27.890	27.722	27.427	29.697
6	27.896	27.719	27.377	29.689
7	27.921	27.722	27.412	29.697
8	27.893	27.693	27.450	29.677
9	27.896	27.713	27.433	29.697
10	27.910	27.687	27.404	29.705
11	27.915	27.716	27.383	29.705
12	27.954	27.708	27.444	29.697
13	27.910	27.682	27.395	29.691
14	27.918	27.702	27.424	29.683
15	27.970	27.739	27.447	29.677
16	27.869	27.699	27.351	29.672
17	27.934	27.719	27.415	29.691
18	27.943	27.693	27.401	29.686
19	27.921	27.687	27.418	29.683
20	27.860	27.653	27.383	29.683
21	27.956	27.731	27.453	29.683
22	27.918	27.696	27.464	29.700
23	27.945	27.676	27.412	29.697
24	27.923	27.739	27.463	29.694
25	27.907	27.716	27.433	29.689
26	27.965	27.774	27.479	29.694
27	27.874	27.644	27.369	29.686
28	27.907	27.722	27.461	29.697
29	27.896	27.705	27.412	29.666
30	27.910	27.722	27.412	29.672
31	27.899	27.725	27.459	29.691
32	27.901	27.699	27.464	29.691
33	27.918	27.673	27.438	29.689

Figure D12. (cont) Run 3, 12-06-93, ZOC #3 (Raw Data)

128

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